



1991 ADVISORY COUNCIL *on* SOCIAL SECURITY

Report on
Medicare Projections
by the
Health Technical Panel
to the
1991 Advisory Council
on Social Security

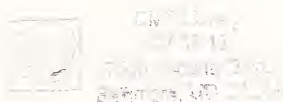
March 1991

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Health Technical Panel
Report
to the
1991 Advisory Council on Social Security





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Washington, DC 20201

Dear Ms. Steelman:

The Health Technical Panel appointed by the 1991 Advisory Council is pleased to submit its report to you.

The primary charge to the Panel was to review the assumptions and methodology underlying the financial projections of the Health Insurance (HI) and Supplemental Medical Insurance (SMI) trust funds, as well as ways of evaluating the soundness of the funds.

In general, we found the projection work of the Health Care Financing Administration to be sound and highly competent. We do, however, have recommendations in each area of our charge.

Early in its work, the Panel concluded that the most significant issues facing Medicare are the serious underfinancing of the HI program and the rapidly rising cost of the SMI program. Consequently you asked us to include in our report a range of options, but not recommendations, for addressing these issues. The options are in the final chapter of the report.

I look forward to discussing our findings with you and the Council.

We appreciate the opportunity the Council gave us to serve in this important endeavor.

Sincerely,

A handwritten signature in cursive script that reads "Judith R. Lave".

Judith R. Lave, Ph.D.
Chair, Health Technical Panel



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PREFACE

In June 1990 the Advisory Council on Social Security convened the Health Technical Panel to assist it in its statutory charge to review the status of the Hospital Insurance (HI) and the Supplementary Medical Insurance (SMI) trust funds in relation to the long-term commitments of the Medicare program. Specifically, the Council asked the Panel to review the assumptions and methods used to project the status of the Medicare trust funds. This is the first technical panel ever convened by an Advisory Council to focus exclusively on the Medicare projections. The 1990 panel includes:

Judith R. Lave, Ph.D., Professor of Health Economics at the University of Pittsburgh (Chair)

David V. Axene, F.S.A., M.A.A.A., Principal Actuary for Milliman & Robertson, Seattle

Robert H. Dobson, F.S.A., M.A.A.A., Vice President and Principal for Towers and Perrin, Atlanta

Stephen G. Kellison, F.S.A., M.A.A.A., Chairman of the Department of Risk Management and Insurance at Georgia State University

Mark V. Pauly, Ph.D., Bendheim Professor of Health Care Systems, Public Management, Insurance and Economics, The Wharton School, University of Pennsylvania

Kenneth E. Thorpe, Ph.D., Associate Professor, School of Public Health, University of North Carolina, Chapel Hill

Harry Sutton, Jr., F.S.A., M.A.A.A., Senior Vice President and Chief Actuary, R.W. Morey, Inc., Minneapolis

Beginning in June and concluding in December 1990 the Panel held six meetings in Washington, D.C. The Office of the Actuary (OAct) of the Health Care Financing Administration was represented at all meetings and provided technical background and analytic support for the Panel. The staffs of the Trustees of the HI and SMI Trust

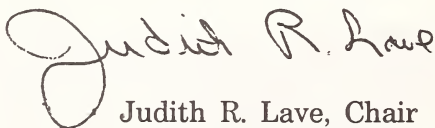
Funds and representatives of the Office of the Actuary of the Social Security Administration also attended the meetings. The staff of the Advisory Council on Social Security provided support to the Panel.

The Panel drew on many resources in its work. It heard detailed presentations from the Chief Actuary and the Director of Medicare Cost Estimates, OAct; it reviewed extensive background materials, heard presentations from invited experts in the field of health economics and actuarial science. Each Panel meeting generated in-depth questioning and discussion.

This report presents the findings of the Panel. The Panel generally concludes that the methods and assumptions used to project the status of the Medicare program are reasonable. It does, however, recommend that some assumptions or methods should differ from those currently used. These are discussed in the report. The Panel unanimously agreed that the projection work of the Office of the Actuary is highly competent.

The Panel particularly wants to thank the HCFA Chief Actuary, Roland King, and the Director of Medicare Cost Estimates, Solomon Mussey, and their staffs for their outstanding support of this project. The Panel's work coincided with significant budgetary and legislative policy deliberations in Congress, which culminated in enactment of new Medicare legislation near the end of the Panel's deliberation. Those activities placed heavy demands on OAct. OAct continued to be responsive to our requests and update the work it had already done for the Panel to reflect the new legislation. The Panel gratefully acknowledges their commitment to this project.

The Panel also thanks the staff of the Advisory Council for their superb support. In particular, it thanks Deborah Queenan, Nancy Row, Virginia Reno, and Adele Eley. Without their help, the Panel could not have accomplished its task.

A handwritten signature in dark ink, reading "Judith R. Lave". The signature is fluid and cursive, with the first name "Judith" being the most prominent part.

Judith R. Lave, Chair
March 15, 1991



SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Panel's findings and recommendations throughout the six chapters of the report follow.

INTRODUCTION

The Panel recommends that a new technical panel be convened in the next 4 to 8 years to review the Medicare program at that time.

MEDICARE PROJECTIONS

The Panel recommends that HI revenues and costs continue to be projected over a 75-year period.

The Panel recommends that the current information in the SMI Trustees Report be supplemented with projections of the expected cost of the SMI program over a full 75-year projection period.

The Panel recommends that certain long-range projections of HI and SMI be made on a compatible basis so that the combined long-range obligations of the Medicare program can be clearly portrayed.

The Panel finds that the methods used to construct incurred experience are reasonable given the limitations of available data.

The Panel concludes that:

- o The projection work by OAct is highly competent;
- o Given the limitations of available data, no better models are evident;

- o Better data are needed to measure past experience as a basis for projecting future costs; and
- o Because of data limitations, the projections for SMI are less sophisticated than for HI.

The Panel recommends that more resources be devoted to enhancing projections for the SMI portion of the Medicare program.

The Panel recommends that more work be done to compare past Medicare cost projections with actual experience.

The Panel recommends strong Federal support for conducting research to develop long-term projections on the use and cost of health care services.

ASSUMPTIONS USED FOR MEDICARE PROJECTIONS

Assumptions Common to OASDI and HI

The Panel supports the recommendation of the Social Security panel to drop the II-A projections for HI as well as for OASDI and to rename the remaining projections: "low-cost" (I), "best estimate" (II), and "high cost" (III).

The Health Technical Panel defers to the finding of the Social Security Technical Panel that the Trustees' intermediate, or best-estimate, demographic assumptions are reasonable.

The Health Technical Panel defers to the recommendations of the Social Security Technical Panel to change the ultimate long-term economic assumptions for the intermediate, or best estimate, projections by: raising the real interest rate to 2.8 percent, and raising the inflation assumption to 5 percent.

The Panel recommends that the Trustees' ultimate best estimate real wage assumption be lowered from 1.3 to 0.7 percent.

Medicare Utilization and Payment Assumptions

The Panel concludes that assumptions used to project HI and SMI costs for the next 25 years are based on reasonable extrapolations of past trends, enhanced by informed judgment about the potential effect of recent legislative and regulatory changes. The Panel concludes that both the assumptions and the resulting projections are reasonable.

The Panel recommends that long-range assumptions about the growth in HI and SMI payments after the first 25 years be monitored closely to ensure that the projections conform to trends developing under the prospective payment system (PPS) and the new resource based relative value scale (RBRVS).

The Panel recommends that the next Health Technical Panel include in its review the alternative I and III assumptions used to project the status of Medicare.

CONTINGENCY RESERVES

The Panel recommends that the HI Trust Fund maintain a contingency reserve at a minimum level of 100 percent of the following year's expenditures.

The Panel also recommends that the cost of building and maintaining HI reserves at 100 percent of annual expenditures be included in the projected long-range cost and balance of HI.

The Panel recommends that SMI Trust Fund reserves (assets on hand minus liabilities for incurred but unpaid cost) should be allowed to range as high as 25 percent of the following year's projected incurred costs over an amount sufficient to cover deviations between projected and actual experience in the year.

MEASURES OF THE FINANCIAL STATUS OF MEDICARE

Hospital Insurance

The Panel recommends a test of the short-run soundness of HI that requires a 100 percent trust fund ratio throughout the first 10 years of the projection period.

The Panel believes a test of long-range balance similar to that recommended for OASDI could usefully be applied to HI, particularly at a time when the HI system is closer to being in balance than it is now.

The Panel concludes that both the present value method and the HI method of calculating the HI actuarial balance have value and should be reported. It further concludes that the controversy over the methods used to calculate the actuarial balance has deflected attention away from the far more important issue; namely, how to deal with the huge long-range financial deficit in HI.

The Panel recommends that the Trustees Report clearly portray the magnitude of the imbalance in the HI program over the 75-year period by showing the projected deficit as a percent of the projected cost.

The Panel believes that the following measures should be highlighted for HI.

1. The year in which the trust funds are projected to exhaust their reserves, as well as the first year in which the reserves fall below a fund ratio of 100 percent.
2. The size of any difference between the cost rate and the income rate in the 75th year of the projection period, which is a measure of ultimate imbalance in the system.
3. The amount of any tax or benefit changes needed to balance income and outgo over the long-range period.

Supplementary Medical Insurance

The Panel recommends that the following specific measure of SMI costs be portrayed over the long-term period.

1. Total SMI costs as a percent of gross national product (GNP) and as a percent of HI taxable payroll.
2. SMI premiums as a share of the average OASDI benefit paid to the elderly.
3. SMI costs net of estimated premium income as a share of GNP and as a share of HI taxable payroll.

Measures for HI and SMI Combined

The Panel recommends that:

- o the HI Trustees Report include projections of the combined costs of HI and SMI over the 75-year projection period; and
- o the OASDI Trustees Report supplement projections of OASDI and HI as a percent of GNP, with projections of OASDI, HI and SMI as a share of GNP over the 75-year period.

ALTERNATIVE SOLUTIONS

The panel recommends that policy makers should consider options for improving the financial status of Medicare not solely in terms of annual budget policy, but rather in terms of structuring the best possible health program for the aged and disabled given the amount of resources society is willing to allocate to it.



I. INTRODUCTION

Overview of Medicare

Medicare is a Federal health insurance program that covers people aged 65 and older, and certain persons under age 65 who are disabled or who suffer from end-stage renal disease. It is authorized under Title XVIII of the Social Security Act. In 1990, approximately 34.3 million people were covered by Medicare.

The Medicare program insures beneficiaries through two parts. Part A, Hospital Insurance (HI), pays in part for inpatient hospital care, certain inpatient care furnished in skilled nursing facilities, home health care and hospice care. Part B, Supplementary Medical Insurance (SMI), pays in part for medically necessary physicians' services, outpatient hospital services, laboratory services, durable medical equipment, and certain other medical services and supplies. In calendar year 1990, Medicare paid approximately \$63.8 billion in HI benefits and approximately \$45.1 billion in SMI benefits.

Both HI and SMI require beneficiary cost sharing. Medicare beneficiaries were subject to an inpatient hospital deductible of \$592 in 1990. Once a beneficiary has paid the inpatient hospital deductible, all remaining costs of covered hospital services for the first 60 days in a benefit period¹ are paid by HI. From the 61st through the 90th day, the patient pays a daily coinsurance amount equal to one-fourth of the inpatient hospital deductible (\$148 in 1990).² HI pays for up to 100 days of post-hospital care in skilled nursing facilities.

¹ A benefit period begins with the first day of hospitalization and ends when the beneficiary has not been in an inpatient or skilled nursing facility for 60 consecutive days. There is no limit on the number of benefit periods an individual may use.

² Each HI beneficiary also has a "lifetime reserve" of 60 additional days when the covered 90 days in a benefit period have been exhausted. Lifetime reserve days may be used only once. The daily coinsurance rate on lifetime reserve days is one-half of the inpatient hospital deductible (\$296 in 1990).

There is no beneficiary cost sharing for the first 20 days; for the 21st through 100th day, the beneficiary pays a daily coinsurance rate equal to one-eighth of the inpatient hospital deductible (\$74 in 1990). The inpatient hospital deductible and coinsurance rates are increased each year by a formula based on the allowed increase in payments to hospitals under the prospective payment system.

For SMI covered services, Medicare beneficiaries were subject to an annual deductible of \$75 in 1990. The SMI deductible was raised to \$100 in 1991 and thereafter by the Omnibus Reconciliation Act of 1990 (OBRA 1990), or P.L. 101-508, which was signed into law by the President on November 5. After meeting the deductible, beneficiaries are also responsible for 20 percent of the cost of Medicare approved charges for most services under SMI.

A fuller description of Medicare benefits those benefits is at Appendix A.

Medicare benefits and administrative expenses are paid from two separate trust funds -- the Federal Hospital Insurance Trust Fund (HI Trust Fund) and the Federal Supplementary Medical Insurance Trust Fund (SMI Trust Fund). The HI Trust Fund receives revenue from a tax on earnings in covered employment under the Federal Insurance Contribution Act (FICA).³ FICA taxes pay both for HI and for Social Security cash benefits under the Old-Age, Survivors and Disability Insurance (OASDI) program. The FICA tax rate, paid by employees and employers each, is 1.45 percent for HI and 6.2 percent for OASDI on earnings up to a specified maximum. The maximum earnings base was the same for OASDI and HI through 1990, when it was \$51,300. OBRA 1990 raised the taxable earnings base for HI to \$125,000 in January 1991. The taxable earnings bases for both OASDI and HI will be adjusted to keep pace with growth in average earnings in future years. The self-employed pay both the employee and the employer share of the OASDI and HI taxes, however, the employer share is treated as a tax deductible business expense.

³ The Self-Employment Contribution Act (SECA) specifies the comparable OASDI and HI tax rates for the self-employed. In this report, reference to FICA taxes is meant to include SECA taxes.

The SMI Trust Fund is financed through general tax revenues and by premiums paid by persons enrolled in the SMI program. In 1990, the monthly premium was \$28.60, which by law was set to cover 25 percent of the projected total SMI costs for the aged. The disabled pay the same premium as the aged. OBRA 1990 specifies the monthly premium levels for 1991 through 1995. In 1991, it is \$29.90; by 1995, it will be \$46.10. These changes were designed to maintain the premium to cover about 25 percent of total SMI costs for the elderly. With no further change in the law, the premium after 1995 will rise by the same percentage as the cost-of-living increase in Social Security cash benefits. General revenues pay the remainder of the SMI cost not covered by premiums.

Table 1 shows the trend in Federal expenditures on Medicare since 1970.⁴ As shown, total Medicare expenditures are estimated to be about \$109 billion in 1990 and to represent about 2 percent of gross national product (GNP), an increase from 0.7 percent of GNP in 1970. Part of the increase between 1970 and 1975 reflects an increase in enrollment because legislation enacted in 1972 extended Medicare to disabled persons under age 65 who had received Social Security cash benefits for at least two years and to persons with end-stage renal disease. Since 1985, expenditures for the HI portion of Medicare have remained a constant share of GNP (1.2 percent) and average payments per enrollee have been fairly stable after adjusting for inflation. However, SMI expenditures continued to rise as a share of GNP (from 0.6 percent in 1985 to 0.8 percent in 1990) and in inflation-adjusted average payments per enrollee (from about \$920 in 1985 to about \$1,300 in 1990, in 1989 dollars).

The growth in Medicare expenditures occurred in the context of rising overall health care expenditures in the United States, as shown in Table 2. National health care expenditures grew from about 7.3 percent of GNP in 1970 to 11.6 percent in 1989. These expenditures include payments for personal health care services for

⁴ In this report, Medicare expenditures include outlays from the HI and SMI trust funds for Medicare covered services. As such, they include trust fund expenditures that are financed by beneficiary premiums, but they do not include the deductibles and coinsurance that beneficiaries pay for Medicare covered services.

Table 1
Medicare Expenditures, 1970-1989

Calendar Year	Total Expenditures a/ (in Percent of billions) GNP		Average Per Enrollee (in 1989 dollars)
	Medicare -- Total		
1970	\$ 7.5	0.7	\$1,169
1975	16.3	1.0	1,507
1980	36.8	1.3	1,946
1985	72.3	1.8	2,680
1986	77.7	1.8	2,769
1987	82.0	1.8	2,763
1988	88.6	1.8	2,815
1989	100.6	1.9	2,995
1990 <u>b/</u>	108.9	2.0	3,012
Hospital Insurance			
1970	\$ 5.3	0.5	\$ 829
1975	11.6	0.7	1,083
1980	25.6	0.9	1,371
1985	48.4	1.2	1,824
1986	50.4	1.2	1,827
1987	50.3	1.1	1,723
1988	53.3	1.1	1,725
1989	60.8	1.2	1,840
1990 <u>b/</u>	63.8	1.2	1,796
Supplementary Medical Insurance			
1970	\$ 2.2	0.2	\$ 361
1975	4.7	0.3	457
1980	11.2	0.4	618
1985	23.9	0.6	918
1986	27.3	0.6	1,010
1987	31.7	0.7	1,112
1988	35.2	0.7	1,168
1989	39.8	0.8	1,239
1990 <u>b/</u>	45.1	0.8	1,297

a/ Expenditures are cash outlays and include administrative costs.

b/ Estimated

Source: Office of National Health Statistics, Office of the Actuary, HCFA, December 1990

Table 2

National Health Care Expenditures, 1970-1989

Calendar Year	Total Expenditures		Percent of Total		
	(in billions)	Percent of GNP	Private	Public	
				Total	Medicare
1970	\$ 74.4	7.3	62.8	37.2	10.3
1975	132.9	8.3	58.5	41.5	12.3
1980	249.1	9.1	57.8	42.2	15.1
1985	420.1	10.5	58.3	41.7	17.2
1988	544.0	11.2	58.0	42.0	16.6
1989	604.1	11.6	58.1	41.9	16.9

Personal Health Care Expenditures for the Aged a/

1970	\$ 17.3	1.7	38.8	61.2	41.1
1977	45.2	2.3	35.1	64.9	42.3
1987	162.0	3.6	37.4	62.6	44.6

a/ Data on personal health care expenditures for the aged have not been revised to be consistent with the new national estimates of total expenditures.

Sources: "National Health Expenditures, 1989" *Health Care Financing Review*, Winter 1990; "Health Expenditures by Age Group, 1977 and 1987," *Health Care Financing Review*, Summer 1989; and "Differences by Age Groups in Health Care Spending," *Health Care Financing Review*, Spring 1980

persons of all ages from public sources -- Federal, State and local governments -- and from private sources -- including individual or group insurance, private philanthropy and out-of-pocket expenditures by consumers. The national expenditures include expenditures for personal health care used directly by individuals, such as hospital care, physician, dental and other professional health care services, home health care, drugs and other medical nondurables, vision products and other medical durables, nursing home services and various other personal health care expenditures. In addition, the national health expenditures include items not designated as personal health care -- or the direct delivery of services to individuals. These include expenditures for noncommercial research, for construction and renovation of medical facilities, for program administration and the net cost of private health insurance, and for public health functions of government -- such as the Centers for Disease Control.

Historical data on personal health care expenditures by age show that these expenditures for persons aged 65 and older grew from 1.7 percent to 3.6 percent of GNP from 1970 through 1987.⁵ Since 1970, the share of total personal health care expenditures for the elderly paid by Medicare changed relatively little, from 41 percent in 1970 to just under 45 percent in 1987. In 1987, other public programs, mainly Medicaid and veterans benefits, accounted for 18 percent of personal health care expenditures for the elderly, while private spending accounted for 37 percent.

Trustees Reports

The Social Security Act established the HI and SMI Trust Funds and requires the Boards of Trustees of those funds to report annually to Congress on the status of the funds. Each Board includes: the Secretary of the Treasury (the Managing Trustee), the Secretary of Labor, the Secretary of Health and Human Services (HHS), and two members of the public who are appointed by the

⁵ Historical data on personal health care expenditures by age, last published for 1987, have not yet been revised to be consistent with the new estimates of total national health care expenditures.

President and confirmed by the Senate. The Administrator of the Health Care Financing Administration (HCFA) serves as the Secretary of the Board.

The Social Security Act stipulates that the report on each trust fund include: (a) a statement of the assets and disbursements from the trust fund during the preceding year; (b) an estimate of expected income and outgo of the fund during the current fiscal year and the next two fiscal years; and (c) a statement of the actuarial status of the trust fund.

To show the actuarial status of HI, the HI Trustees Report includes projections of the income and outgo and the actuarial balance of the fund over the next 75 years under four sets of economic and demographic assumptions, which are the same as those used to project the status of OASDI. The intermediate (II-B) assumptions are the most often used. Under these assumptions in the HI Trustees Report issued in April 1990, the HI Trust Fund would be exhausted in 2003. The report also shows that the cost of HI, expressed as a percentage of taxable payroll, is expected to rise rapidly after the turn of the century. In 1990, HI costs were 2.56 percent of the taxable payroll, while revenues from the HI taxes paid by employees and employers were 2.90 percent. The costs were projected to rise to over 4 percent of payroll by 2010 and to over 7 percent of payroll by 2030. The Trustees state in their report:

[b]ecause of the magnitude of the projected actuarial deficit in the HI program and the probability that the HI Trust Fund will be exhausted shortly after the end of this century, the Board believes that early corrective action is essential in order to avoid later, potentially precipitous changes...⁶

The OBRA 1990 changes -- primarily the increase in the HI taxable earnings base -- are projected to delay the depletion of the HI Trust Fund by about three years, until 2006. Data presented in this report generally reflect the OBRA 1990 changes, unless otherwise noted.

⁶ 1990 Annual Report of the Board of Trustees of the Federal Hospital Insurance Trust Fund, p. 57.

The SMI Trustees Report includes projections for the current year and the next two years only; the statement of actuarial status for SMI is for the current year. The Trustees, in their report, state that:

In testing the actuarial soundness of the SMI program, it is not appropriate to look beyond the period for which the enrollee premium rates and level of general revenue financing have been established.⁷

The Trustees conclude, however, that the rapid growth in the cost of SMI is a serious concern, noting that SMI outlays have almost doubled over the last five years and the program has grown 40 percent faster than the economy as a whole.

The Omnibus Budget Reconciliation Act of 1989, P.L. 101-239, revised the Medicare physician payment system under SMI. The new Medicare fee schedule (MFS) will be phased in over five years beginning in 1992. The MFS is based, in part, on a resource-based relative value scale, and incorporates volume performance standards that are designed to control the rate of growth in SMI outlays. That law also limits what doctors may charge beneficiaries over and above the Medicare allowed fee. Projections of SMI costs that are presented later in this report reflect these changes in the law.

Charge to the Panel

Every four years, an Advisory Council on Social Security is appointed to review the status of the Social Security and Medicare trust funds in relation to the long-term commitments of those programs. By law, the Council reports to the Secretary of Health and Human Services, who transmits the report to Congress. As did some other Advisory Councils, the 1991 Advisory Council convened a Social Security Technical Panel to review the long-range assumptions and methods used to project the status of the OASDI program. In September 1990, that panel reported its findings

⁷ 1990 Annual Report of the Board of Trustees of the Federal Supplementary Medical Insurance Trust Fund, p. 32.

regarding the measures of the status of the OASDI program and the demographic and key economic assumptions that determine the projected status of OASDI.

For the first time ever, the Advisory Council on Social Security also convened a Health Technical Panel. In convening the health panel, the Advisory Council was cognizant of the fact that the demographic assumptions for OASDI, such as birth rates, mortality rates, immigration, and disability incidence rates, determine the projected size of the workforce and beneficiary populations for HI, as well as OASDI. Similarly, the key economic assumptions for OASDI, such as inflation rates, real wage growth, and real interest rates, are important determinants of the projected payroll tax revenues for HI and are among the inputs for estimating HI benefit costs.

Thus, the charge to the Health Technical Panel was to review assumptions and methods that are of special importance to the Medicare program. To the extent that the Panel could avoid it, while still accomplishing its purpose, the Panel was asked not to duplicate the review of the economic and demographic assumptions performed by the Social Security panel. Specifically, this Panel was asked to examine:

- o the appropriate projection period for the HI and SMI programs;
- o the development of incurred experience of the HI and SMI programs from available data;
- o the factors to be considered in projecting future trends for various health utilization and price assumptions;
- o the appropriate level of the contingency reserves for the Hospital Insurance (HI) and Supplementary Medical Insurance (SMI) programs; and
- o the appropriate method for expressing the long-range actuarial balance for the HI program.

Report Overview

Chapter II of this report covers the first two items in the Panel's charge. It details the Panel's recommendations on the appropriate period for projecting the status of the HI and SMI programs. It also presents the Panel's findings on the methods used to develop incurred experience from available data and the methods used to project the cost of health care benefits. It includes the Panel's recommendations to improve the quality of data available for Medicare projections.

Chapter III reports the Panel's views on the assumptions used to project the status of Medicare. It includes the Panel's review of the findings of the Social Security Technical Panel regarding the demographic and economic assumptions common to both OASDI and HI. It also reports the Panel's views on the health care utilization and payment assumptions that are unique to the Medicare program.

Chapter IV presents the Panel's recommendations on the appropriate minimum contingency reserve targets for the HI and SMI Trust Funds.

Chapter V outlines recommendations for short-range and long-range measures of the financial status of the HI and SMI programs and of the Medicare program as a whole.

Chapter VI presents a range of options for improving the long-range status of Medicare. Early in its deliberations, this Panel found that the most critical issues with regard to Medicare were the projected depletion of the HI Trust Fund, the serious imbalance between long-range costs and revenues for the program, and the rapid growth in the costs of the SMI program. The Chair of the Advisory Council on Social Security asked that the Panel include in its report a range of options, but not recommendations, for addressing these issues. That range of options and the Panel's conclusions about the status of the Medicare program are in Chapter VI.

As the first technical panel ever convened to review the Medicare projections, this Panel focussed its review on those issues that are most critical at this time. The Medicare program has undergone frequent legislative changes in the 1980s and its design, payment

methods and long-range financing will be a subject of continuing debate in the 1990s. The reliability of the long-range projections will be critical in this debate.

The Panel recommends that a new technical panel be convened in the next 4 to 8 years to review the Medicare program at that time.



II. MEDICARE PROJECTIONS

This chapter first discusses the appropriate period for projecting the status of the HI and SMI programs and then reviews the methods used to project Medicare costs, including the methods used to develop incurred experience from available data.

Projection Period

In the 1990 Trustees reports, HI revenues and costs are projected over the next 75 years, while SMI income and outgo are projected only for the current year and the next two years.

Hospital Insurance. In its 1990 report, the Board of Trustees of the HI Trust Fund states that a 75-year projection period is necessary to portray long-term shifts in the demographic composition of the population. In particular, the long-term projections are needed to show the sharp increase in program costs that occur after the turn of the century, when the large baby boom cohort reaches retirement age and the relatively smaller cohorts following the baby boom make up the work force.

The Panel recommends that HI revenues and costs continue to be projected over a 75-year period.

The Panel agrees that it is essential that the projection period be long enough to include the lifetimes of most persons entering the workforce in that year. It should, for example, capture the significant demographic effects on workers and retirees as the baby boom generation retires. The HI program represents long-term commitments for both contributors and retirees. Consequently, the projections should show the obligations that are likely to be incurred for HI benefits during the remaining lifetimes of workers currently making HI contributions. The Panel believes that 75 years is a reasonable maximum period for projecting the status of HI, and that projections over shorter periods also should continue to be made.

Supplementary Medical Insurance. The SMI Trustees Report shows projected income and outgo of the SMI Trust Fund, in current dollars, for the current year and the next two years only. Projected income includes premiums paid by enrollees and transfers from general revenues. As noted in Chapter I, the SMI Trustees Report indicates that, because the level of SMI premiums and general revenue contributions are established only for the current year, the concept of the actuarial status of the SMI Trust Fund is appropriate only for the current year. The Panel believes, however, that the long-term obligations of SMI are similar to those of HI despite the difference in financing methods.

The Panel recommends that the current information in the SMI Trustees Report be supplemented with projections of the expected cost of the SMI program over a full 75-year projection period.

The SMI program, like the HI program, represents long-term obligations that are being incurred by present and future taxpayers and enrollees in the program. Like HI costs, SMI costs are expected to increase significantly when the large baby boom cohort retires. Therefore, the Panel believes that the current two-year projections, which satisfy the minimum requirements in the Social Security Act, should be supplemented with projections of the long-term cost of SMI over the next 75 years. Recommended measures of the status of SMI over the period are discussed in Chapter V.

The Panel recommends that certain long-range projections of HI and SMI be made on a compatible basis so that the combined long-range obligations of the Medicare program can be clearly portrayed.

The HI and SMI components of the Medicare program complement each other and, in some respects, offer substitutable services. Changes in medical technology have meant that treatments which once could be provided only in the inpatient setting can now be provided in the outpatient setting, or even in the patient's home. In addition, changes in medical practice, stimulated in part by various cost containment initiatives, have led to a shift of some care away from the acute care hospital inpatient to the outpatient setting. Thus, some services which were previously performed on

an inpatient basis (and financed by HI) are now being performed on an outpatient basis (and financed by SMI). The distinction between HI and SMI services, which may have been clear in 1965 when the program was introduced, has become increasingly blurred over time.

Table 3 portrays this shift. In the initial years of the Medicare program, the HI program dominated the SMI program. In both 1970 and in 1980, SMI accounted for roughly 30 percent of the total Medicare expenditures.

Following enactment of the prospective payment system (PPS)⁸ for hospitals in 1983, the HI share of Medicare expenditures declined while the SMI share grew. By 1989, the SMI program accounted for about 41 percent of Medicare expenditures. Projections prepared by the Office of the Actuary (OAct), HCFA, indicate that by 2010, the SMI share will approach 50 percent of Medicare expenditures.⁹

Because the HI and SMI programs are so closely linked, the Panel believes it is important to have long-range projections that show the combined cost of all services financed by Medicare. In this way, policymakers, taxpayers and present and future beneficiaries will have a clearer picture of the total obligations of the Medicare program. Specific recommendations for long-range measures for the combined HI/SMI program are in Chapter V.

⁸ PPS makes an average payment to hospitals based on the average cost of treating particular illnesses or injuries. These illnesses and injuries are currently categorized into 471 separate diagnosis related groups (DRGs). The DRG by which the hospital is paid is determined by evaluating the patient's major or principal diagnosis, complications, surgery, and other factors. Hospitals are provided additional compensation for patients who stay beyond a predetermined length of stay or who incur costs beyond a predetermined amount.

⁹ Table 10 in Chapter V includes these projections.

Table 3

Share of Medicare Expenditures for HI and SMI, 1966-1989

Calendar Year	Total Medicare Expenditures <u>a/</u> (\$ in millions)	Share For:	
		HI	SMI
1966	\$ 1,202	83	17
1970	7,493	70	30
1975	16,316	71	29
1980	36,822	69	31
1981	44,754	69	31
1982	52,371	69	31
1983	58,861	68	32
1984	64,439	68	32
1985	72,294	67	33
1986	77,721	65	35
1987	82,029	61	39
1988	88,561	60	40
1989	96,886	59	41

a/ Total disbursements from HI and SMI Trust Funds, including administrative costs.

Source: *1990 Report of the Board of Trustees of the Hospital Insurance Trust Fund*, (Table 6) and *1990 Report of the Board of Trustees of the Supplementary Medical Insurance Trust Fund*, (Table 6), and unpublished data from the Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

Method of Projecting Medicare Costs

Each year the OAct prepares projections for the HI and SMI Trustees Reports. The method used involves developing estimates of recent and current incurred experience under the program and projections of future costs.

Incurred Experience. There are two basic ways to present benefit costs in a health benefit program -- paid experience and incurred experience. Paid experience refers to the level of actual cash payments made during a period, regardless of when services were provided to beneficiaries. On the other hand, incurred experience measures reimbursable services actually provided during the period, regardless of when cash payments are made.

Incurred experience is the more appropriate base for projecting future costs for two reasons. First, it provides a more reliable baseline for cost projections because it eliminates the nonrecurring effects of changes in regulations, legislation or administrative actions that affect the timing and flow of funds to providers, but not the liabilities actually incurred by the program. Second, the law requires that certain features of the program -- such as the SMI premium -- be based on incurred experience.

Incurred experience must be reconstructed from HCFA records for both the HI and SMI programs. The process to develop incurred experience begins with a tabulation of claim payment records by incurred date (i.e., date of service) for each type of provider and type of beneficiary (aged or disabled). HI payments by date of service are tabulated on a 100 percent basis. SMI payments by date of service are tabulated on a sample basis because of the very large volume of SMI bills.

Because a large amount of time is required to complete processing by providers, intermediaries, carriers and HCFA, data for the most recent time periods are quite incomplete. OAct develops adjustment factors to reflect the incompleteness of reporting for recent periods. Various reasonableness checks are applied to validate the assumptions. For example, cash lag factors are applied to the incurred estimates to determine estimated interim cash payment amounts. These are then checked against national summary data provided by

the Bureau of Program Operations, HCFA for reasonableness. The underlying incurred estimates are adjusted if the comparison does not seem reasonable.

The Panel finds that the methods used to construct incurred experience are reasonable given the limitations of available data.

Cost Projections. The basic formula for projecting claim payments, or costs, is as follows:

$$\text{Claim Payments} = \text{Enrollment} \times \text{Utilization units per person} \times \text{Payment per utilization unit}$$

or

$$\text{Enrollment} \times \text{Payment per person, where}$$

$$\text{Payment per person} = \text{Utilization units per person} \times \text{Payment per utilization unit}$$

In making projections for HI, OAct uses the first approach which requires the identification of both utilization units and per unit reimbursement levels. For inpatient hospital services, the utilization unit is admissions per capita and the unit of service is admissions. On the other hand, in making projections for the SMI program, OAct uses the second formula. The payment per person for physician services is broken down into allowed fees and a residual factor to take account of such factors as increased physician visit rates, aging, trend towards specialists, and administrative actions.

In order to make projections for claims payments, OAct must make projections of Medicare enrollees and utilization rates for all services. In addition, it makes projections of health care prices as discussed in Chapter III. The process used by OAct adequately considers the key factors. For example, trends in HI admission rates are tracked through multiple sources to validate the assumptions reflecting both internal HI data and external data from the American Hospital Association (AHA). Changes in demographic characteristics of the elderly can have an important effect on admissions. The model used by OAct builds in age/sex utilization factors to reflect changes in demographic characteristics. The underlying demographic characteristics of the Medicare population are based

upon assumptions consistent with the OASDI projections. The latest historical information on per capita admission rates is used to adjust increase factors to reflect changes in admission rates.

For the SMI program, OAct makes projections for both reimbursements per enrollee and charges per enrollee. Reimbursements per enrollee exclude the coinsurance and deductible, while charges per enrollee include them. Projection factors are developed to inflate base charges per enrollee for future years. Because the SMI deductible had remained constant at \$75 for several years (prior to OBRA 1990) the increases in reimbursements per enrollee have been greater than the increase in charges per enrollee.

Considering the many complicating factors that must be recognized in a program of this size and complexity, OAct is applying a reasonable actuarial approach to make the cost projections. The method involves an iterative projection and reconciliation process that makes use of professional actuarial experience and applies adequate considerations and reasonableness checks to assure sound estimates.

The Panel consulted with actuaries and economists outside HCFA on possible alternatives to, or improvements in, the methods used by OAct. The people that we contacted did not have any significant criticisms of the HCFA projection methodology. Furthermore, we could not find any alternative projection methods. However, many of the people that we contacted indicated that the projections could be improved if HCFA had better data with which to work.¹⁰ Based on this review and on the opinions of the outside experts, the Panel concludes that:

- o The projection work by OAct is highly competent;
- o Given the limitations of available data, no better models are evident;
- o Better data are needed to measure past experience as a basis for projecting future costs; and

¹⁰ Appendix B lists the people and agencies the Panel consulted.

- o Because of data limitations, the projections for SMI are less sophisticated than for HI.

Based on these findings, the Panel has the following recommendations:

The Panel recommends that more resources be devoted to enhancing projections for the SMI portion of the Medicare program.

As noted above, the quality of data and projection methods for SMI are less sophisticated than for HI. Because SMI is consuming an increasing proportion of Medicare funds, improvements are needed in HCFA's ability to project SMI cost. Furthermore, additional work on SMI projections will be needed to fulfill the Panel's recommendation that SMI costs be projected over 75 years (rather than just 2 years). The Panel, therefore, believes that more emphasis should be placed on enhancing SMI projection methods.

The Panel recommends that more work be done to compare past Medicare cost projections with actual experience.

The Panel recognizes that the rapid pace of legislative and regulatory changes in the Medicare program make it extremely difficult to compare past projections with actual experience. It nonetheless believes that such efforts would be useful and should be supported.

The Panel recommends strong Federal support for conducting research to develop long-term projections on the use and cost of health care services.

The Panel is particularly interested in improving the quality of data for Medicare cost projections, including projections of the impact of policy changes on program costs. In this regard, it strongly supports the following three initiatives currently being undertaken by HCFA and other HHS agencies, as well as other initiatives to enhance research on health care utilization and costs.

- o The Current Beneficiary Survey is a renewed initiative sponsored by HCFA and HHS. (The last such survey was done in 1977 in conjunction with the Social Security Administration.) It

is a longitudinal survey of a nationally representative sample of aged and disabled persons enrolled in Medicare, including the institutionalized. Sample members will be interviewed several times a year to collect information about their use of health care services, their sources of health insurance coverage and payment, including out-of-pocket payments, their income and assets, health and functional status, work histories and family supports.

- o The Beneficiary Health Registry, sponsored by HCFA and the Agency for Health Care and Policy Research, will establish a longitudinal data base on the health status of 5 percent of the elderly as they enter the Medicare program. The survey will periodically interview the beneficiaries to update information on risk factors, activities of daily living, current medical conditions, socio-demographic factors and quality of life.
- o The Common Working File, for the first time, integrates at nine HCFA regional processors, the administrative claim records for beneficiary experiences under the HI and SMI program. This improves upon the previous process, in which data for Medicare institutional services were processed by 50 separate fiscal intermediaries and data for non-institutional services were processed by 34 separate carriers. Under the earlier system linking the physician bill with the related hospital bill was difficult to accomplish. This new administrative system is expected to improve the quality and timeliness of data. It will also greatly facilitate the linkage of claims information about an episode of care that crosses institutional settings.

The Panel supports other improvements in administrative processes that will enhance data analysis capabilities. These improvements in the scope and quality of data should enhance the cost projection capabilities of HCFA, particularly its work to project the impact of program changes on future costs.



III. ASSUMPTIONS USED FOR MEDICARE PROJECTIONS

Projections of the long-range costs for both Medicare and OASDI depend on assumptions about demographic trends that determine the size and age distribution of the population. Projections of the revenues of both OASDI and HI depend on economic trends that affect the size of the economy and the level of earnings that serve as the tax base for each program. In addition, Medicare cost projections depend on assumptions regarding trends in the utilization of covered health care services and the cost of those services.

The Advisory Council on Social Security asked the Social Security Technical Panel to examine the demographic and economic assumptions for projecting OASDI, many of which are common to HI. That panel reported its findings in September 1990. This chapter of the Health Technical Panel report sets forth its views on the recommendations of the Social Security Technical Panel as to the applicability of their assumptions for HI. It also reports our review of the assumptions regarding health benefit utilization and costs that are unique to the Medicare program.

Assumptions Common to OASDI and HI

The Trustees use four alternative sets of assumptions to project the status of HI and OASDI. Two sets -- Alternative II-A and II-B -- are designated as "intermediate." Both sets share the same demographic assumptions, but differ in their economic assumptions. Somewhat more robust economic growth is assumed under Alternative II-A than under II-B. The II-B assumptions are the ones most often used.

The Alternative I set of assumptions is designated as "optimistic" in that it generally includes values for demographic and economic variables that result in lower relative cost of the programs. The Alternative III, or "pessimistic" assumptions, include values that result in higher relative costs. The Social Security Technical Panel recommended that the II-A projections be dropped and that the

remaining three sets be renamed "low cost," "best estimate," and "high cost."

The Panel supports the recommendation of the Social Security panel to drop the II-A projections for HI as well as for OASDI and to rename the remaining projections: "low cost" (I), "best estimate" (II), and "high cost" (III).

Demographic Assumptions. The Social Security panel reviewed the Trustees 1990 assumptions on the following demographic variables: mortality rates, fertility rates, immigration, marriage and divorce rates, retirement rates and disability incidence rates. The Social Security panel suggested some changes in the low cost and high cost assumptions for some of these variables. It concluded, however, that all of the intermediate, or best estimate, long-range assumptions for these variables are reasonable.

The Health Technical Panel defers to the finding of the Social Security Technical Panel that the Trustees' intermediate, or best estimate, demographic assumptions are reasonable.

Economic Assumptions. The Social Security panel focussed its review of economic assumptions on the three variables that have the largest potential impact on the long-range projections of OASDI: the rate of price inflation, as measured by the consumer price index (CPI); the real wage differential, which is the rate of total wage growth minus the CPI; and the real interest rate, which is the total interest rate minus the CPI. The Social Security panel recommended the following changes in the Trustees' intermediate (II-B) assumptions for these variables:

- o raise the ultimate inflation rate assumption from 4 to 5 percent;
- o raise the ultimate real interest rate assumption from 2.0 to 2.8 percent; and
- o lower the ultimate real wage growth assumption from 1.3 to 1.0 percent.

Their rationale for raising the inflation assumption is to make it more consistent with forecasts made in the private sector. Their rationale for raising the ultimate real interest assumption and for lowering the ultimate real wage assumption is, in both cases, to place somewhat greater weight on recent experience over more distant past experience. Both recommended changes are consistent with a weighted average of experience over the postwar period (1951-1989), using geometric weight factors declining at an annual rate of .95. That is, in averaging past experience, the weight of each more distant past year in the average is reduced by 5 percent.

The Health Technical Panel defers to the recommendations of the Social Security Technical Panel to change the ultimate long-term economic assumptions for the intermediate, or best estimate, projections by: raising the real interest rate to 2.8 percent and raising the inflation assumption to 5 percent.

The Panel decided to review the real-wage assumption because the Trustees' decision about this assumption was challenged as too high by the HCFA Chief Actuary in his statement of actuarial opinion in both the 1989 and the 1990 HI Trustees Reports. The Panel believes that this assumption should be lowered by more than the amount recommended by the Social Security panel.

The Panel recommends that the Trustees' ultimate best estimate real wage assumption be lowered from 1.3 to 0.7 percent.

The Panel examined several projections of real wage growth in both the near term and over the full projection period. In particular, it received papers by Cogan and Raisian and by Murphy and Welch that were prepared for HCFA.¹¹ The Panel drew conclusions from those papers that differ from those of the Social Security panel. Cogan and Raisian provide an ultimate long-range "scenario" which envisions a growth rate of 0.7 percent, with shorter term estimates bounded between 0.1 and 0.7. Murphy and Welch agree that "there is nothing in the (data) that supports forecasts of growth in labor

¹¹ John F. Cogan and John Raisian, "Historical Trends and Projected Real Wage Growth in the United States." (November 30, 1989.) Kevin Murphy and Finis Welch, "Recent Trends in Real Wages: Evidence from Household Data." (May 1989.)

productivity of 1.0 percent annually..." and, therefore, forecast a similar rate of 0.6 to 0.7 percent for the period up to 2012; this rate is based on assuming that the base rate equals the 1963-87 real quality adjusted wage growth of 0.4 percent and then adding an adjustment for expected changes in worker quality of 0.3 percent for 1990-2000 and 0.2 percent for the period from 2000 to 2012.

These estimates indicate some differences over the short-term projections, but very close agreement on a longer term estimate of about 0.7 percent; accordingly, we suggest using that figure for the ultimate long-range projections.

The Panel recognizes that the level of the real wage assumption is very important in the HI projections. A lower real wage assumption is prudent because it reduces projected HI revenues by more than it reduces projected HI costs. This occurs because the wage sensitive portion of the hospital market basket currently accounts for only about 60 percent of the total market basket that is used to project HI costs, as discussed in the following section.

Table 4 shows the impact of all these recommendations on the projected costs of the HI program. The annual cost of HI benefits as a percent of taxable payroll is somewhat higher than under II-B assumptions under the recommendations of the Social Security panel and are higher still under our recommended assumptions. For example, by 2020, the cost of HI as a percent of taxable payroll is 5.7 percent under the Trustees' 1990 II-B assumptions; under the Social Security panel's recommendations, it is 5.8 percent; and under our recommended assumptions, it is 6.0 percent.

Table 4

Effect on HI Costs a/
of Changes in Economic Assumptions
Recommended by the Social Security Technical Panel
and the Health Technical Panel, 1990-2060

Calendar Year	Economic Assumptions of:		
	Trustees	Social Security	Health
	1990	Technical	Technical
	II-B b/ Cost as a percent of taxable payroll	Panel c/ Panel d/	Panel d/
1990	2.56	2.55	2.55
1995	2.90	2.91	2.92
2000	3.42	3.44	3.48
2005	3.82	3.84	3.92
2010	4.34	4.38	4.49
2015	5.07	5.14	5.28
2020	5.73	5.82	5.97
2025	6.48	6.61	6.77
2030	7.13	7.29	7.46
2035	7.53	7.73	7.88
2040	7.72	7.92	8.07
2045	7.80	8.02	8.15
2050	7.90	8.11	8.23
2055	8.00	8.23	8.33
2060	8.11	8.35	8.44

a/ All estimates reflect HI financing changes in OBRA 1990 and updated HI admissions assumptions.

b/ Economic assumptions are: inflation 4%; real interest 2.0%; and real wage 1.3%

c/ Economic assumptions are: inflation 5%; real interest 2.8%; and real wage 1.0%.

d/ Economic assumptions are: inflation 5%; real interest 2.8%; and real wage 0.7%.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

Medicare Utilization and Payment Assumptions

Hospital Insurance. For the Medicare program, projections of the utilization of health care services are determined largely by the projected size and composition of the aged and disabled populations that will be covered, or enrolled, in the program in the future. For HI inpatient hospital services (which represent about 92 percent of HI costs), utilization is measured by hospital admissions. HI admissions are projected by assuming that the growth in the number of admissions per aged and disabled enrollee will be similar to the growth experienced in years prior to the implementation of the prospective payment system. During the first 25 years of the projection period, this growth rate is gradually tapered off to the rate of growth explained by the changing age composition of the enrolled population during that period. The historical annual rates of increases in admissions per capita are shown in Table 5. While it has fluctuated considerably since 1975, the average annual increase was about 1.5 percent, through 1983.

The growth in admissions per enrollee will also take account of shifts in the age (in 5-year intervals) and gender composition of the enrolled population in the future. By the end of the first 25 years, changes in admissions per enrollee reflect only changes in the age and gender composition of the enrolled population. The population projections are based on the demographic assumptions used for OASDI projections that are discussed at the beginning of this chapter.

Assumptions needed to project the average hospital payment (or reimbursement) per admission are developed specifically for the Medicare program. The driving factor in the increase in hospital payments per admission is the hospital market basket, which represents the cost of goods and services purchased by hospitals in order to provide care to their inpatients. The hospital market basket, developed by OAct, is made up of two parts -- labor inputs (the compensation paid to hospital employees) and nonlabor inputs (such as food, supplies and energy that hospitals must buy to provide inpatient care).

Table 5

Historical and Projected Annual Increase in
HI Hospital Admissions per Enrollee, 1975-1995

Calendar Year	Percent Increase in Admissions per enrollee
Historical	
1975	0.1
1976	1.5
1977	4.6
1978	-1.9
1979	3.1
1980	2.4
1981	2.7
1982	0.0
1983	0.8
1984	-3.8
1985	-7.4
1986	-4.9
1987	-4.3
1988	-0.8
Projected	
1989	-1.9
1990	0.4
1991	1.2
1992	1.2
1993	1.3
1994	1.3
1995	1.3

Source: *1990 Report of the Trustees of the Hospital Insurance Trust Fund*, Table A1, page 72

The cost of the hospital market basket is projected separately for the labor component (which currently accounts for about 60 percent of the total) and the nonlabor component. The projected increase in the labor component is the increase in average hourly earnings in the economy, plus a residual factor to account for particular trends in the earnings of hospital workers relative to other workers. The assumed rate of growth in economy-wide hourly earnings is consistent with the assumed growth in average annual wages (that is, inflation plus real wage growth) used for OASDI and HI revenue projections. To convert the average annual wage assumption into a trend for hourly earnings, 0.2 percent is added to the figure for the annual wage trend to generate an estimate of the hourly trend that reflects an assumed decline in hours worked per year.

Assumptions about the residual factor specific to hospital workers is based on historical trends. This factor has fluctuated widely since 1975, but averaged about 0.3 percent over the period, as hospital workers' earnings rose faster than general earnings. This residual factor is assumed to be 0.5 percent over the next 25 years, and then to decline to zero shortly thereafter. In sum, the labor components of the hospital market basket is assumed to grow with average hourly earnings in the economy, plus 0.5 percent over the next 25 years, and then level off at the rate of increase in economy-wide earnings thereafter.

The nonlabor component of the hospital market basket is assumed to rise with the CPI, plus a residual factor to take account of increases in the price of goods and services that hospitals purchase that do not parallel the increase in the CPI. Although it has varied widely, this differential has averaged about 0.5 percent since 1975. It is assumed to continue at 0.5 percent over the next 25 years and to decline to zero shortly thereafter. In sum, the cost of the nonlabor component of the hospital market basket is assumed to rise by the CPI plus 0.5 percent over the next 25 years and to rise by the CPI thereafter.

After estimating the increase in the hospital market basket, two other adjustments are made to project average hospital payments per admission. The first takes account of legislated deviations between the allowed prospective payment rate and the hospital market basket. Under the law, the allowed increase in payment

per admission is based on the hospital market basket, unless *ad hoc* adjustments in the payment rate have been enacted. In the past, Congress has set the increase in the payment rate below the full increase in the market basket in each year from 1986. The OBRA 1990 legislation also sets the increase in the payment rate below the full increase in the market basket for the next 3 years. Beyond the period for which *ad hoc* adjustments have been legislated, this adjustment is assumed to be zero, i.e., that the payment rate would rise with the full increase in the market basket, as provided under current law.

The final adjustment used to project average hospital payments per admission is designed to take account of changes due to other sources, such as: more sophisticated DRG coding as hospitals continue to adjust to the prospective payment system; and the trend toward treating less complicated (and thus less expensive) cases in outpatient settings, resulting in an increase in the average payment per admission. This adjustment is assumed to be 2.0 percent for 1991 - 2000; 1.0 percent for 2000 - 2014; and zero thereafter.

Taken together, the increase in HI payments per hospital admission are projected to rise more rapidly than average earnings over the next 25 years and to rise at the same rate as average economy-wide annual earnings thereafter. Consequently, the growth in HI costs as a percent of taxable payroll that occurs after the first 25 years is due almost exclusively to demographic changes in the size and composition of the aged and disabled enrolled populations.

Supplementary Medical Insurance. As noted in Chapter II, SMI costs are not routinely projected beyond the current year and the next two years. For the long-range projections of SMI costs that are presented later in this report,¹² increases in SMI payments per enrollee over the next 25 years are assumed to continue historical trends and then gradually taper off to grow at the rate of increase in GNP. Beyond the first 25 years, SMI payments per enrollee are assumed to grow at the same rate as the growth in GNP.

The Panel concludes that assumptions used to project HI and SMI costs for the next 25 years are based on reasonable

¹² Tables 10-11 in Chapter V.

extrapolations of past trends, enhanced by informed judgment about the potential effect of recent legislative and regulatory changes. The Panel concludes that both the assumptions and the resulting projections are reasonable.

With regard to projections beyond the first 25 years, the Panel has carefully considered the assumptions that the growth in HI payments per admission will level off to match the growth in economy-wide earnings and the growth in SMI payments per enrollee will level off to match the growth in GNP.

The Panel recommends that long-range assumptions about the growth in HI and SMI payments after the first 25 years be monitored closely to ensure that the projections conform to trends developing under the prospective payment system (PPS) and the new resource based relative value scale (RBRVS).

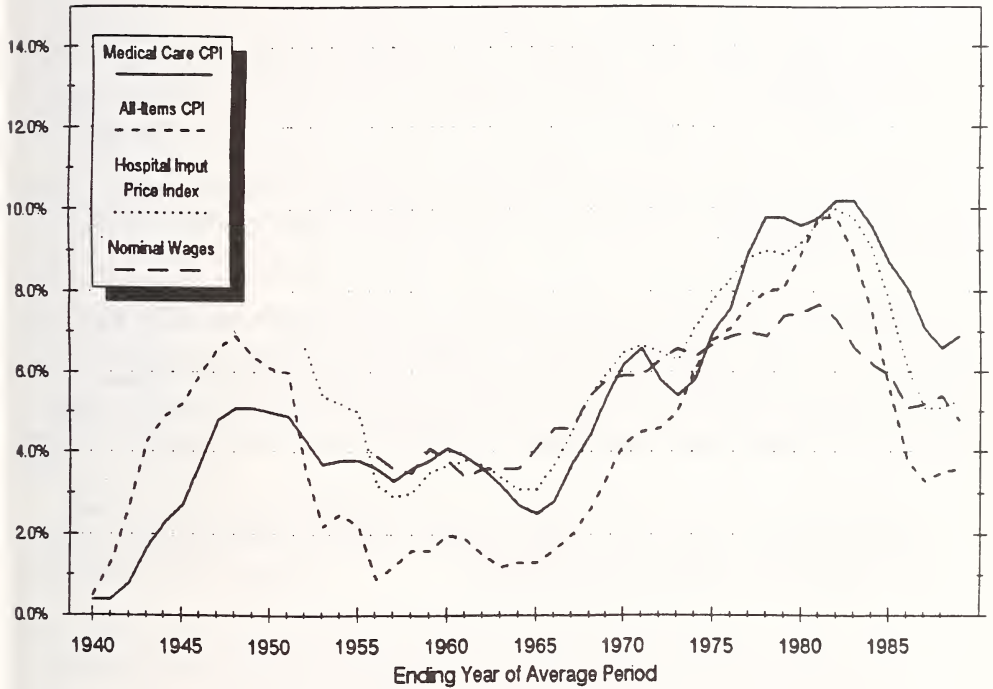
With regard to HI, it appears reasonable to assume that the growth in the price of hospital inputs will ultimately equal the growth in wages. As shown in Figure 1, hospital input prices grew at approximately the rate of wage growth from the mid-1950s through the early 1970s and again in 1987 and 1988. When wage growth was sluggish during the 1970s and early 1980s, hospital input prices grew more rapidly than wages.

In addition, the assumption that HI payments per admission will rise with wages implies that increases in the case mix index will cease. When PPS began, there were large initial increases in the case mix index (about 10 percent). These large increases appear to have been due to refinements in DRG coding and substantial reductions in inpatient admissions. The foregone admissions tended to be less complex cases that may have been shifted to outpatient settings (and financed by SMI), leaving a more intensive case mix among HI inpatient admissions. The rate of growth in case mix intensity has dropped to less than 2 percent in recent years. Thus, to assume that it will decline to zero after 25 years may not be unreasonable.

Finally, increases in hospital admission per enrollee (over and above that explained by the aging of the population) are assumed to cease.

FIGURE 1

**FIVE-YEAR AVERAGES OF ANNUAL PERCENT CHANGE
SELECTED ECONOMIC INDICATORS**



Admissions experience since the implementation of PPS suggests this assumption may not be unreasonable. Initial experience under PPS showed substantial disruptions in both admission rates and case mix trends. Thus far, increases in the case mix index have largely been offset by declines in admission rates. The Panel believes that further experience under PPS should be closely monitored and that long-range assumptions about HI admission and payments should be adjusted, if necessary, as further experience develops under PPS.

The Panel has already recommended that SMI costs, like HI costs, should be projected over a full 75 year period and that more resources and research should be devoted to enhancing SMI projections and improving data on the interaction between HI and SMI. Assumptions about SMI payments per enrollee beyond the first 25 years should be reevaluated as more is learned about the causes of growth in SMI costs and as new experience develops under both PPS and RBRVS.

The Panel did not review the low-cost (I) and high-cost (III) assumptions for the HI projections because the imbalance in HI is very serious under all three scenarios. In addition, alternative I and III assumptions have not been developed for SMI because SMI has not routinely been projected beyond the next two years.

The Panel recommends that the next Health Technical Panel include in its review the alternative I and III assumptions used to project the status of Medicare.



IV. CONTINGENCY RESERVES

In its charge, the Panel was asked to consider the appropriate level of contingency reserves for both the HI and the SMI programs. A contingency reserve is an amount of funds maintained by a risk-assuming entity to allow it to continue operations under periods of adverse experience. The reserves serve two interrelated purposes: First, they enable the system to weather temporary periods of unanticipated adverse experience when income falls short of, or costs exceed, expectations; Second, they also allow lead time for policy makers to respond by changing the system if adverse conditions persist.

For social insurance programs financed by payroll taxes -- such as OASDI and HI -- temporary periods of adverse conditions could occur: if revenue from FICA taxes on earnings fell short of expectations because of unanticipated increases in unemployment or declines in wage growth; or if expenditures exceeded expectations because of unanticipated increases in benefit costs. The SMI Trust Fund could also experience adverse conditions if benefit costs greatly exceed projected levels in a given year. The Panel considered the appropriate levels of contingency reserves for HI and SMI separately.

Hospital Insurance

For HI and OASDI, the level of contingency reserves is usually measured as the cash assets of the trust fund, expressed as a percent of projected expenditures from the fund over the following twelve months.

The HI Board of Trustees, in its 1990 Annual Report, recommended that:

it is advisable to maintain a balance in the trust fund equal to a minimum of one-half year's disbursements, as a reserve against fluctuations in program experience and to provide time for any needed legislation to remedy unexpected

imbalances. At the beginning of 1990, the trust fund was above the minimum desired level.¹³

The Social Security Technical Panel recommended a contingency reserve balance of 100 percent of annual expenditures for the OASDI trust fund. It further recommended that the cost of building and maintaining the fund ratio at 100 percent should be included in the long-range cost of the program.

The Office of the Actuary, HCFA, has estimated the effect on the HI Trust Fund reserves of adverse experience such as that reflected in the high cost (Alternative III) assumptions used in the 1990 Trustees Report. Under current law, the HI fund, which equalled 134 percent of outgo at the beginning of 1990, would be exhausted in 1999 under these conditions (Table 6). OAct also estimated the effect of these high cost conditions under an alternative policy scenario. In that scenario, HI would be financed by a schedule of future pay-as-you-go tax rates that had been established in 1990 based on 1990 II-B assumptions. Under this scenario, the fund would be exhausted in eleven years (in 2001). If, however, the initial fund ratio had begun at 100 percent, the fund would be depleted in eight years; if the initial fund ratio had been only 50 percent, the fund would be depleted in four years. (See Appendix C for further information on these estimates.)

The Panel recommends that the HI Trust Fund maintain a contingency reserve at a minimum level of 100 percent of the following year's expenditures.

The Panel also recommends that the cost of building and maintaining HI reserves at 100 percent of annual expenditures be included in the projected long-range cost and balance of HI.

The Panel considered a higher target reserve level, but finally agreed that 100 percent is an acceptable minimum reserve target. It believes that the 50 percent reserve target currently used for HI is inadequate. This Panel agrees that the risks faced by the HI program are probably greater than, but at least as great as, those

¹³ 1990 Annual Report of the Board of Trustees of the Federal Hospital Insurance Trust Fund, p. 41.

Table 6

Effect on HI Trust Fund Reserves of
High Cost Conditions (1990 Alternative III), 1990-2001

Calendar Year	Trust Fund Reserves <u>a/</u> (in billions)	Contingency Fund Ratio <u>b/</u> (percent)
<u>Current Law Tax Rate</u>		
1990	\$101.7	134
1991	115.0	145
1992	125.4	146
1993	131.9	142
1994	132.4	134
1995	126.3	120
1996	112.0	101
1997	87.2	80
1998	50.1	56
1999	<u>c/</u>	29
<u>Alternative Scenario <u>d/</u></u>		
1990	\$ 91.7	134
1991	96.3	130
1992	99.9	121
1993	101.6	112
1994	99.6	102
1995	95.5	89
1996	87.7	76
1997	75.1	62
1998	57.2	47
1999	33.3	32
2000	3.1	17
2001	<u>c/</u>	1

a/ Trust fund reserves at the end of the year.

b/ Reserves at end of prior year divided by outgo for the year.

c/ Trust fund is exhausted.

d/ Alternative scenario in which a schedule of future pay-as-you-go tax rates was established in 1990 based on 1990 II-B assumptions.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

faced by OASDI and in Chapter V we discuss a test of the short-range solvency for HI that is more strict than has been recommended for OASDI by the Social Security panel. Chapter V also includes estimates of the impact of the Panel's recommendation to include the cost of 100 percent reserves in the long-range cost and balance of HI.

Supplementary Medical Insurance

Under current law, SMI is funded from general revenues and premiums paid by beneficiaries. The calculation of the actuarial rate for determining the general revenue contribution and the premium (in years when the premium is set by law to be a specified share of SMI costs) is made each year based on the most recent information available. In effect, income to the SMI trust fund is established each year to meet the projected costs for the following year. Consequently, a contingency reserve is not needed for the purpose of allowing lead time for policy makers to respond to adverse conditions that persist over a number of years. However, a small fund balance is maintained to allow for deviations between projected and actual experience for any given year.

The SMI contingency reserve, or fund ratio, is usually measured as the ratio of assets less liabilities for incurred, but unpaid, costs at the end of a year to the following year's incurred costs. These actual ratios have ranged from 0 to 26 percent since the mid-1970s. OAct has suggested that an optimal minimum SMI contingency reserve, to allow for deviations between actual and projected experience for any given year, would be 6 percent. This represents the average amount by which the SMI fund ratio fell short of projected levels in those years when experience was worse than projected. In most years, experience was not worse than projected. (See Appendix D for more information on this estimate.)

The Health Technical Panel believes that a minimum trust fund balance for SMI should be maintained to cover such annual fluctuations and to maintain premium stability. Based on the assumption that it is desirable to have more stable premium increases for elderly beneficiaries, rather than to minimize premiums, a trust

fund balance which is allowed to fluctuate over time to stabilize premium increases is recommended.

The Panel recommends that SMI Trust Fund reserves (assets on hand minus liabilities for incurred but unpaid costs) should be allowed to range as high as 25 percent of the following year's projected incurred costs over an amount sufficient to cover deviations between projected and actual experience in the year.

In years when the SMI premium increase is linked to SMI costs, a larger reserve would allow flexibility to stabilize the increase in the premium should cost increases fluctuate greatly from one year to the next. Building reserves to achieve the 25 percent target should be phased in so as not to cause an increase in the SMI premium solely for the purpose of building reserves.



V. MEASURES OF THE FINANCIAL STATUS OF MEDICARE

In Chapter II, the Panel recommended that the Trustees continue to use a 75-year projection period to report the revenues and expenditures for the HI program. In addition, we recommended that the Trustees report on the SMI program for a 75-year projection period. This chapter discusses measures that describe the financial status of HI and SMI, separately, and of the two programs combined.

Hospital Insurance

The HI Trustees Report presents a variety of measures of the financial status of the HI program. Many of these measures show the financial status of the funds at various points of time, whereas other measures attempt to summarize the state of the funds over various time periods. The measures reported in the Trustees Report include:

- (1) The contingency reserve ratios. The contingency reserve ratios show the cash assets of the trust fund as a percent of projected expenditures for the year.
- (2) Annual data on revenues and expenditures and the relationship between them. The following measures are reported as a percent of taxable payroll:
 - (a) Revenues from the HI payroll tax;
 - (b) Expenditures for HI benefits;
 - (c) The cost of building and maintaining minimum trust fund reserves after accounting for the offsetting effect of interest earnings;
 - (d) Annual balances, which are the difference between HI revenues and benefit expenditures, (a) minus (b);

- (e) The total cost of HI benefits and reserve maintenance, (b) plus (c);
 - (f) Augmented annual balances, which are the difference between payroll tax revenues and total costs, (a) minus (e).
- (3) Summary measures of actuarial balance. These measures, which are discussed in more detail below, describe the actuarial balance of the HI Trust Fund over the full 75-year period, as well as for 25-year and 50-year subperiods.

The year-by-year measures portray complete information about the status of the fund. However, they include so much data that it may be difficult to assimilate information in order to form valid conclusions about the financial soundness of the trust fund. The Panel believes that summary measures of HI balance are useful in describing the status of the fund. In addition, the Panel believes that it is important to have clear tests that indicate whether the system is in or out of balance in both the short run and the long run.

Short-Range Test of Balance for HI. The Social Security Panel recommended a short-run test for the soundness of OASDI over the first 10 years of the projection period. To meet that test of short-term soundness, the OASDI system would need:

- o to have a contingency reserve or fund ratio at the beginning of each year of more than 50 percent, or
- o be projected to achieve a fund ratio of more than 50 percent within 5 years and remain at, or above, that level, and
- o have revenues sufficient to pay benefits in each month in the 10-year period.

Failure of this test would indicate a serious problem in OASDI financing that should be brought to the immediate attention of policy makers.

This Panel believes that it is desirable to develop a short-range test for HI. Therefore:

The Panel recommends a test of the short-run soundness of HI that requires a 100 percent trust fund ratio throughout the first 10 years of the projection period.

The Panel believes that failure of this test for HI means that there is a serious problem with the structure of the HI program. This problem should be brought to the immediate attention of policy makers, so they can consider policy options for changing the program.

The panel recommended a stricter short-range test for HI than for OASDI for several reasons. First, under current law, the revenue and expenditure patterns for OASDI and HI are quite different. In particular, the OASDI trust fund is building rapidly and will continue to do so into the next century, whereas the HI Trust Fund is not. If the short-range test being recommended for HI were applied to OASDI in 1990, it would signal that the fund is in difficulty when it clearly is not.

Second, the risk of unexpected worsening of financial condition is greater for HI than for OASDI because of uncertainties associated with health benefit costs. For both programs, payroll tax revenues can fall short of expectations due to unexpected increases in unemployment or declines in real wage growth. Similarly, the benefit costs of both programs can exceed expectations because of unanticipated increases in the CPI. However, HI costs can also be affected by unanticipated changes in hospital utilization, the mix of covered services provided, or other changes in the labor or non-labor components of the hospital market basket.

Third, the Panel believes it is prudent to build in greater lead time for policy makers to respond to a problem in HI because the causes of the problem, as well as the range of solutions, may be more complex for a health benefit program than for a cash benefit program. With adequate warning that the HI system is out of short-range balance, policy makers can thoughtfully diagnose the causes of the problem and consider a broad range of options to remedy it. Further, the options can include those that require some lead time to be implemented.

Finally, a comparison of the 1990 projections for OASDI and HI indicates that during the periods in which the trust funds are declining rapidly (approximately 2040 for OASDI and 2000 for HI) the decline in the HI fund ratio is more rapid than for OASDI.

Under intermediate (II-B) assumptions, the HI system would have failed this short-range test of financial soundness at the time of the 1990 Trustees Report because the projected fund ratio in 2000 was below 100 percent. (However, HI would have passed a test requiring only a 50 percent fund ratio.) OBRA 1990 changes in HI financing are projected to delay by about three years both the depletion of the HI fund and the year in which the fund ratio would fall below 100 percent. Thus, when HI financing changes enacted in OBRA 1990 are taken into account, the HI system would meet the Panel's recommended test under 1990 II-B assumptions.

Long-Range Test of Balance for HI. The Social Security Technical Panel also recommended a long-range test of financial soundness for OASDI. Their recommended test could be viewed as a refinement of a test of "close actuarial balance" that was used for OASDI until 1989, when it was dropped from the OASDI Trustees Report because it was considered an incomplete measure of that system's financial soundness. Under the prior test, OASDI was considered in "close actuarial balance" if its actuarial deficit did not exceed 5 percent of the summarized cost of OASDI over the 75-year period. The newly recommended test for OASDI would:

- o Summarize OASDI actuarial balances for all valuation periods up to 75 years including both the beginning trust fund balance and the cost of building and maintaining a contingency reserve equal to 100 percent of annual expenditures throughout the 75-year period.
- o Apply a tolerance level for an actuarial deficit of 5 percent of the summarized cost rate over the full 75-year period and grading uniformly to zero at the beginning of the first projection period.
- o Use a present value calculation of the actuarial balance.

The Social Security panel believed that while the short-range test is intended to signal the need for immediate legislative action; the long-range test is intended to signal the need for attention to more distant difficulties. The timing of any action that may be needed to address a long-range problem depends on the degree and timing of the projected financial imbalance.

Figures 2 and 3 show the status of the OASDI Trust Fund and the HI Trust Fund, respectively, in relation to this test of long-range balance. The OASDI balance is in surplus for valuation periods through about 2037. Then the OASDI deficit remains within the graded 5 percent tolerance level through valuation periods extending as far as 2049. For projections beyond 60 years OASDI fails this test of long-range balance.

HI fails this test much more quickly. The deficit falls below the graded 5 percent tolerance level for valuation periods longer than about 10-14 years. At the end of the 75 year period the HI deficit, which is roughly 50 percent of the summarized cost, is far outside of the 5 percent tolerance level.

The Panel believes a test of long-range balance similar to that recommended for OASDI could usefully be applied to HI, particularly at a time when the HI system is closer to being in balance than it is now.

At the present time, HI is far out of balance by any test that might be used. As noted, the HI deficit is about half of the summarized cost of HI over the next 75 years, meaning that revenue would need to be roughly doubled over the period in order to match the projected cost.

Methods of Calculating the Actuarial Balance. The actuarial balance is meant to be a summary measure that captures the relationship between income and outgo throughout the 75 year projection period. Figure 4 depicts the pattern of HI income and outgo this single measure is meant to summarize. It shows that the HI annual income rate (revenue as a percent of taxable payroll) is constant at 2.90 percent throughout the period. This represents

FIGURE 2

TEST OF LONG-RANGE OASDI BALANCE

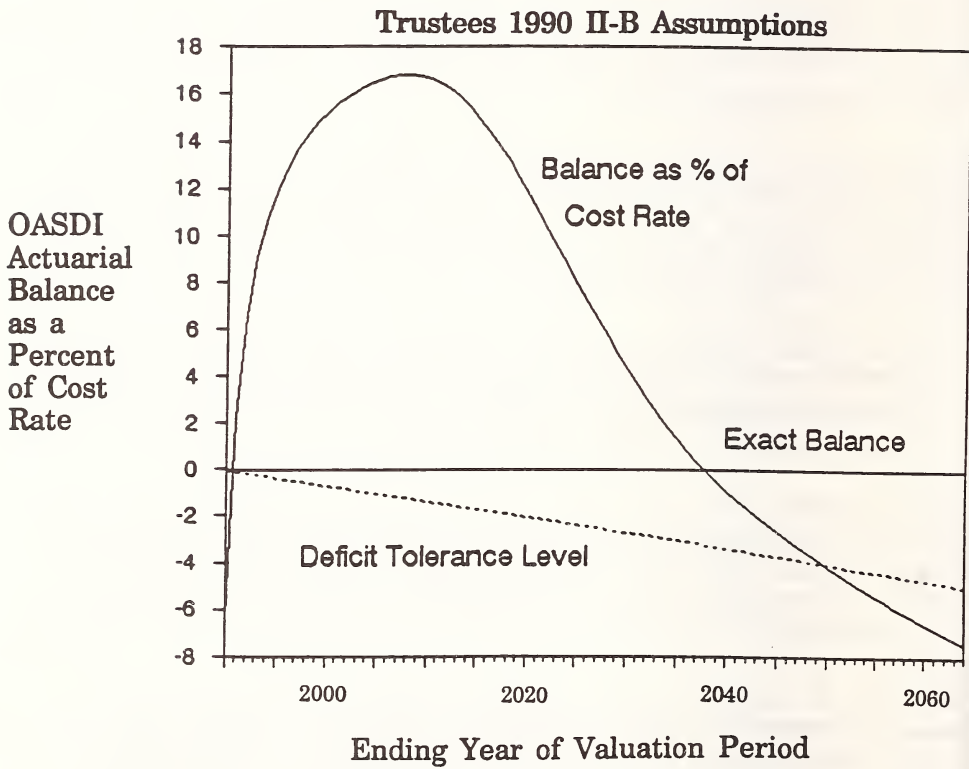


FIGURE 3

TEST OF LONG-RANGE HI BALANCE

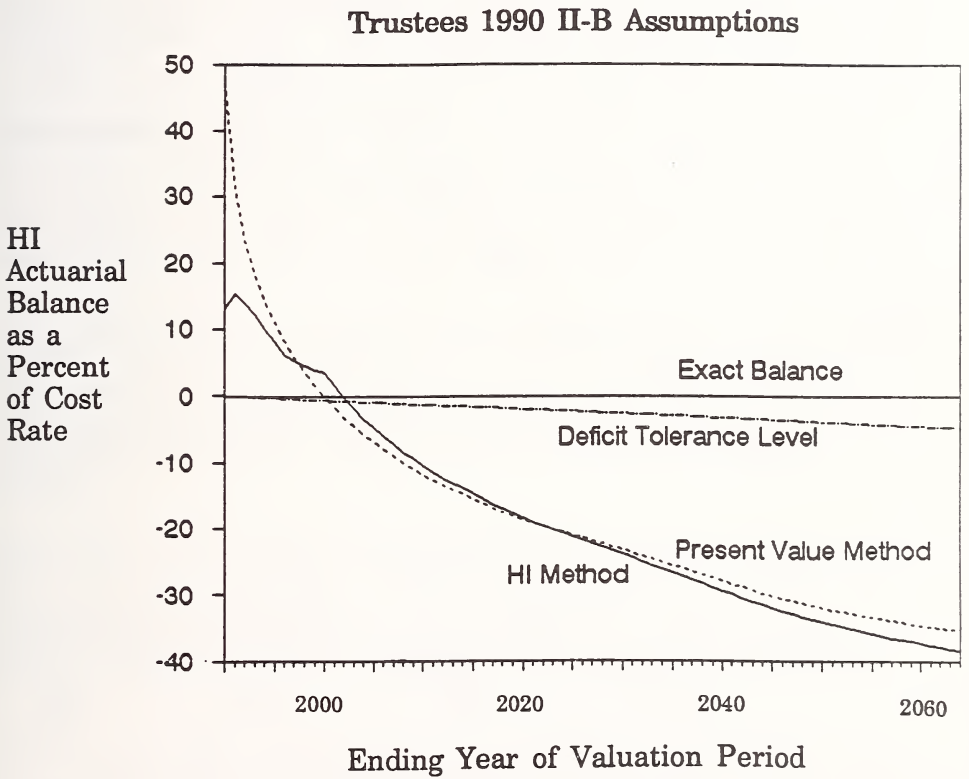
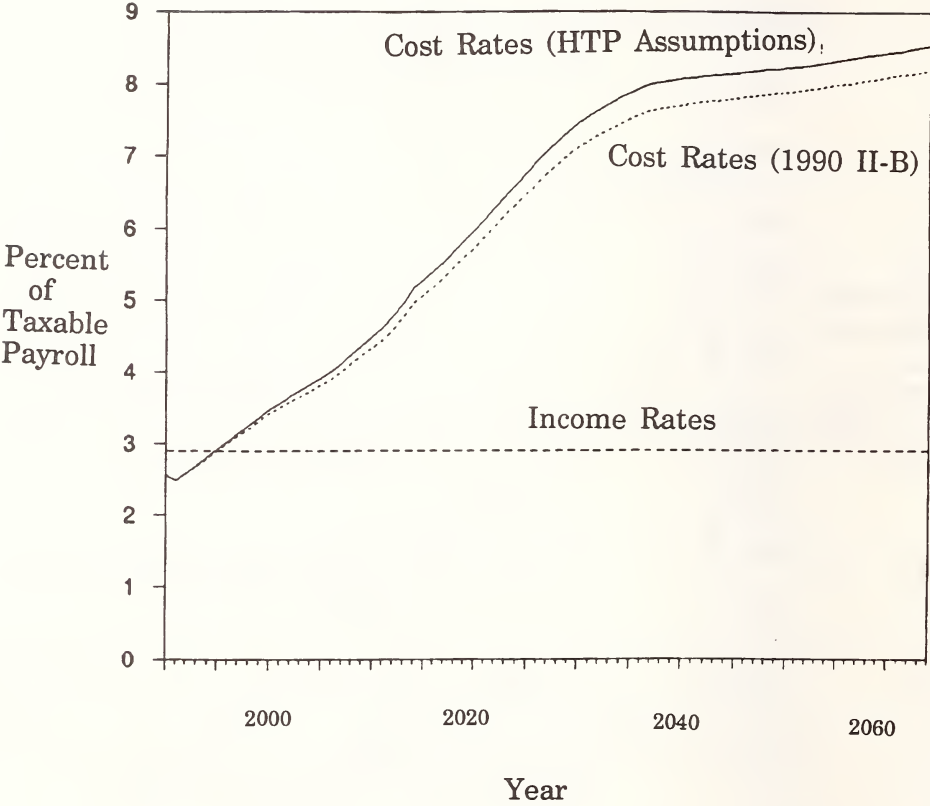


FIGURE 4

HI ANNUAL INCOME RATES AND
COST RATES, 1990-2060



the HI payroll tax rate of 1.45 percent paid by both employees and employers. Figure 4 also shows that the HI annual cost rates (cost as a percent of taxable payroll) rise rapidly from just under 2.9 percent in 1990 to over 6 percent in 2025 and to about 8 in 2060, under the Trustees' 1990 II-B assumptions; under the Health Panel's recommendations, the annual cost rates rise somewhat higher. Under any set of assumptions, the issue in deciding how to calculate the HI balance is how best to summarize the pattern of income rates and cost rates in one single number.

Three different methods have been used to calculate the long-range actuarial balance of OASDI and/or HI, and opinions differ about the relative merits of each. The "present value method," was used prior to 1972 and was reintroduced in 1988. It is the method preferred by the Trustees and is used in the 1990 Trustees Reports for both OASDI and HI. The 1990 HI Trustees Report also presents an alternative calculation developed by actuaries at HCFA called the "HI method," which was used for the HI program prior to 1988.¹⁴ A third method, the "average cost method" was used for the OASDI program from 1972-1987, but is no longer used.¹⁵

The Social Security Technical Panel recommended: that the present value method continue to be used for OASDI; that it continue to include the beginning trust fund balance in the measure of trust fund income; and that it be modified to include in the cost of the program, the target ending fund, or contingency reserve of 100 percent.

The Health Panel has also recommended that the cost of maintaining a 100 percent contingency reserve be reflected in the measure of actuarial balance for HI. Under current practice, the cost of building and maintaining 50 percent reserves is included in the HI method, while no reserve requirement is reflected in the present

¹⁴ In the 1990 HI Trustees Report the "HI method" of calculating the balance is called the "augmented balance."

¹⁵ In Appendix E1, an excerpt from an article by Harry Ballantyne, Chief Actuary of Social Security, explains the shift to the average cost method in 1972 and the return to the present value method in 1988.

value method of summarizing the long-range cost and balance. Under 1990 II-B assumptions, using the HI method and raising the reserve requirement from 50 to 100 percent increases the long-range cost and deficit by .04 percent of taxable payroll. Using the present value method and raising the reserve requirement from zero to 100 percent increases the long-range cost and deficit by .10 percent of taxable payroll. Table 7 shows how including the cost of different reserve requirements would change the summary measure of HI costs under both the HI and the present value methods, relative to current practice.

When this recommendation is taken into account, both the present value (PV) method and the HI method will include: the initial trust fund reserve as part of the income; and the target 100 percent reserve as part of the cost of HI. The two measures differ, however, in the way in which the balance is calculated.

The PV method adjusts for the time value of money by using the interest rate that is assumed to be earned by trust fund reserves that are invested in U.S. Treasury securities. This interest rate is used as the discount rate to adjust the future stream of income and outgo to "present values." Under the PV method, the trust fund balance is calculated as:

- o the summarized income rate (which is the present value of program revenue divided by the present value of taxable payroll) minus
- o the summarized cost rate (which is the present value of program costs divided by the present value of taxable payroll).

The resulting balance can be interpreted as the amount of tax rate increase that, if put into place today, would bring the system into exact balance. The Panel believes that the present value measure is not in any way a prescription or prediction that such a tax rate increase should or would be enacted to balance the system.

The HI method does not use a present value calculation. Rather, it is the arithmetic average of the 75 annual balances for each year of the projection period. Each annual balance includes an amount

Table 7

Effect on Hospital Insurance (HI) 75-Year Cost
of Proposals to Maintain Specified Reserve Ratios
in the HI Trust Fund

(1990 II-B Assumptions)

Target Reserve Ratio Requirement <u>a/</u>	Change in Cost as a Percent of Taxable Payroll under: <u>b/</u>	
	HI Method	Present Value Method
-0- reserves	-.03	-0-
50 percent reserves	-0-	+.05
100 percent reserves	+.04	+.10
125 percent reserves	+.06	+.12

a/ Reserve ratios are reserves (or cash assets) of the HI Trust Fund at the end of the year, expressed as a percent of the following year's expenditures.

b/ Under current practice, the HI method of summarizing long-range costs includes the cost of building and maintaining 50 percent reserves, while the present value method does not include the cost of any reserve requirement.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

to maintain the trust fund at a specified reserve level after taking into account the interest earnings on the trust fund. Using the HI method one would:

- o calculate the annual balance for each of the 75 years, (where the annual balance is the annual income rate minus (the annual cost rate plus a maintenance amount expressed as a percent of taxable payroll)); and then
- o calculate the average of the 75 annual balances.

This summary measure can be interpreted as an average of the 75 individual tax rate changes (from the current combined 2.9 percent rate) that would maintain the trust fund at a specified reserve level throughout the 75-year projection period. It, too, is not a prediction that such a tax rate schedule would be enacted to balance the system.

One way to characterize the main difference between the two measures is the way in which they take account of interest over the 75-year period. This difference is discussed in the paper at Appendix E2.¹⁶

Another way to characterize the key difference between the two methods is the way in which they take account of the time value of money over the 75 year period. The PV method, as noted, uses the assumed interest rate to adjust for the time value of money. The HI method, in contrast, is mathematically equivalent to a present value calculation that uses as a discount rate the projected rate of growth in aggregate taxable payroll (rather than the assumed interest rate).¹⁷ If by coincidence, the rate of growth in taxable payroll exactly matched the assumed interest rate, then the HI method and the PV method would produce identical results for the HI balance. That is not now the case, however.

¹⁶ "Proposed Changes in Method of Measuring Actuarial Balance for HI," by Roland E. (Guy) King, F.S.A., Chief Actuary, HCFA

¹⁷ In Appendix E3, a paper by John Hambor discusses in more detail the mathematical relationship between the present value method, the HI method, and the average cost method.

method and the PV method would produce identical results for the HI balance. That is not now the case, however.

The Panel has examined at length the choice between the present value method or the HI method for calculating the actuarial balance and concludes that there are strengths and weaknesses in each approach.¹⁸ We agree that the appropriateness of using present value calculations based on projected interest rates to summarize cash flows over an extended period of time is well established within the actuarial, economics and finance literature. We also believe that the present value method produces a summary measure that is readily explained and understood. However, we also understand that the summary measure calculated by the HI method is less sensitive to changes in the assumed interest rate, particularly when the size of imbalance in the system varies greatly over time.

The Panel concludes that both the present value method and the HI method of calculating the HI actuarial balance have value and should be reported. It further concludes that the controversy over the methods used to calculate the actuarial balance has deflected attention away from the far more important issue: namely, how to deal with the huge long-range financial deficit in HI.

The magnitude of the long-range financing problem for HI is portrayed in Table 8, which shows the projected costs and actuarial balance for HI, under the present value method and the HI method under alternative sets of assumptions after taking account of HI financing changes enacted in OBRA 1990.

¹⁸ In Appendix E4, a memorandum from Sol Mussey, Director of Medicare Cost Estimates, explains how the present value method is affected by changes in assumptions about the real interest rate and real wage growth. Appendix E5 includes a joint opinion on this topic by the Committee on Social Insurance of the American Academy of Actuaries and the Society of Actuaries. Appendix E6 includes another paper on this topic by Richard Foster, F.S.A., Toni Hustead, A.S.A., and Stephen McKay, F.S.A.

Table 8
Status of HI ^{a/} Under Alternative Methods
of Summarizing the 75-Year Balance
and Alternative Economic Assumptions

75-Year Summary Measure	Present Value	HI
	Method	Method
	<u>Trustees II-B Assumptions ^{b/}</u>	
Revenue	2.90	2.90
Cost	5.81	6.06
Balance	-2.91	-3.16
Balance as percent of cost	- 50%	- 52%
	<u>Social Security Panel Assumptions ^{c/}</u>	
Revenue	2.90	2.90
Cost	5.38	6.12
Balance	-2.48	-3.22
Balance as percent of cost	- 46%	- 53%
	<u>Health Panel Assumptions ^{d/}</u>	
Revenue	2.90	2.90
Cost	5.35	6.21
Deficit	-2.45	-3.31
Balance as percent of costs	- 46%	- 53%

^{a/} Cost and balance reflect the cost of 100 reserve requirement. All estimates reflect HI financing changes in OBRA 1990 and updated hospital admission assumptions.

^{b/} 1990 II-B assumptions are: 4% inflation; 2% real interest; and 1.3% real wage.

^{c/} Social Security Panel assumptions are: 5% inflation; 2.8% real interest; and 1.0% real wage.

^{d/} Health Panel assumptions are: 5% inflation; 2.8% real interest; and 0.7% real wage.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

As shown, under the Trustees' II-B assumptions, the present value method produces a long-range actuarial balance for HI of -2.91 percent of taxable payroll. Under the HI method, the long-range actuarial balance is -3.16 percent. The HI method produces a somewhat larger summary deficit than does the present value method. But, the long-term financing problems facing HI are enormous under both measures. Viewed another way, under the present value method, projected HI income falls short of meeting projected costs by 50 percent. Under the HI method, it falls short by 52 percent. An essential finding under both methods is that the HI deficit is about half of the projected costs over the 75-year period, meaning that revenue would have to roughly double or costs would need to be cut by roughly half in order to bring HI into balance.

The Panel recommends that the Trustees Report clearly portray the magnitude of the imbalance in the HI program over the 75-year period by showing the projected deficit as a percent of the projected cost.

We believe that this measure of the magnitude of imbalance in the HI program is important to convey to policy makers. By this measure, the HI financing problem is of similar magnitude regardless of which calculation method is used. The Panel believes that the finding that HI is underfinanced by roughly half the current cost (or by roughly 100 percent of the current tax rate) is far more important than the difference between the size of the balance under the two alternative methods of summarizing the long-range costs.

Other Summary Measures for HI. The Social Security panel proposed other summary measures that it believed should be highlighted in the OASDI projections. The Panel believes that the following measures should be highlighted for HI.

- 1. The year in which the trust funds are projected to exhaust their reserves, as well as the first year in which the reserves fall below a fund ratio of 100 percent**

As noted above, the HI Trust Fund is projected to become exhausted in 2006 and the fund ratio is projected to fall well below

100 percent in 2003, under the 1990 II-B assumptions. Thus, this measure provides a sense of the immediacy of the short-range problems facing the system.

2. The size of any difference between the cost rate and the income rate in the 75th year of the projection period, which is a measure of ultimate imbalance in the system

This is important because it indicates the ultimate imbalance in the system, i.e. the amount by which taxes must ultimately be increased or benefits ultimately reduced. Under 1990 II-B assumptions, after taking account of OBRA 1990, by 2060 HI costs are projected to be 8.1 percent of taxable payroll, while revenues are 2.9 percent, representing an annual deficit at that time of 5.2 percent of taxable payroll. In essence, revenue would meet only 37 percent of HI costs at that time. Or viewed another way, annual revenue in 2060 would need to be nearly three times the current tax rate in order to meet the annual cost.

3. The amount of any tax or benefit changes needed to balance income and outgo over the long-range period

The magnitude of needed changes typically depends on when the changes are implemented. The longer policy makers postpone corrective action, the larger the adjustment will need to be. For example, after taking account of OBRA 1990 changes, the level of tax rate increase needed in 1990 to put HI in long-range balance is 2.91 percent. If action were delayed 10 years, the necessary increase would be 3.45 percent (Table 9).

On the other hand, if the system were to be brought into 75-year balance without raising taxes, HI costs would need to be reduced by roughly 50 percent. For illustrative purposes, the Panel obtained rough estimates of the magnitude of changes that would be needed if that cost reduction were to be achieved solely by altering: (1) hospital admissions; (2) the PPS update factor for allowed increases in inpatient hospital payments per admission; or (3) the HI inpatient deductible. The estimates are:

- o admissions would have to be reduced by 52 percent;

Table 9

Increase in HI Tax Rate Needed to Balance the
HI Trust Fund through 2064, by Timing of the Increase

Timing of Single Rate Increase a/	Rate Increase Needed to Balance HI	
	Under Economic Assumptions of:	
	Trustees 1990 II-B	Health Panel
1990	2.91	2.45
1991	2.95	2.51
1992	3.00	2.58
1993	3.05	2.64
1994	3.11	2.71
1995	3.16	2.79
1996	3.21	2.86
1997	3.27	2.94
1998	3.33	3.02
1999	3.39	3.10
2000	3.45	3.19

a/ The year in which the specified tax rate increase would put the HI fund in exact balance under the present value method of calculating the balance. All estimates reflect the cost of a 100 reserve requirement, the HI financing changes in OBRA 1990, and updated hospital admission assumptions.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

- o the PPS update factor in each year would have to be about 2 percent lower each year than the increase in the cost of the hospital market basket. This represents about a 36 percent decrease, on average, in the annual update factor;
- o the inpatient deductible would have to be about \$4,200 in 1991.

Background on these estimates is in Appendix F.

Supplementary Medical Insurance

In Chapter II, the Panel recommended that information currently presented in the SMI Trustees Report be supplemented with projections of SMI costs over the full 75-year projection period in order to more clearly portray the long-term obligations of the program, and to capture the effect on SMI costs of demographic shifts that occur when the baby boom retires.

The Panel recommends that the following specific measure of SMI costs be portrayed over the long-term period.

1. **Total SMI costs as a percent of GNP and as a percent of HI taxable payroll**

Total program costs as a share of GNP show the increasing share of national resources that will be needed to pay for the SMI benefits provided under current law to future beneficiaries. As shown in Table 10, SMI costs as a share of GNP are projected to roughly triple over the next 30 years, from 0.8 percent in 1990 to 2.5 percent in 2020. The slower growth thereafter reflects underlying assumptions that, after the first 25 years, SMI per capita costs grow at the same rate as GNP. Consequently, the growth in cost as a share of GNP after 2015 is solely the result of demographic changes. By 2060, SMI costs are projected to be 3.5 percent of GNP.

The costs of SMI as a percent of HI taxable payroll also are shown in Table 11. The Panel recognizes that SMI is not financed by the payroll tax, and is not recommending that it should be. However, projections of SMI outlays as a share of HI taxable payroll offer

Table 10

HI, SMI and OASDI Outgo as a Percent of GNP,
1990-2060

(1990 II-B Assumptions)

Calendar a/ Year	Program Outgo as a Percent of GNP			
	HI	SMI	HI and SMI	OASDI
1990	1.15	0.82	1.97	4.56
1995	1.39	1.04	2.43	4.54
2000	1.62	1.39	3.01	4.45
2005	1.80	1.73	3.53	4.45
2010	2.04	2.02	4.06	4.61
2015	2.36	2.24	4.60	5.06
2020	2.64	2.51	5.15	5.67
2025	2.96	3.81	5.77	6.21
2030	3.22	3.06	6.28	6.54
2035	3.37	3.18	6.55	6.61
2040	3.42	3.21	6.63	6.52
2045	3.43	3.20	6.63	6.44
2050	3.44	3.21	6.65	6.45
2055	3.45	3.27	6.72	6.51
2060	3.46	3.34	6.80	6.53

a/ Estimates reflect HI and SMI changes enacted in OBRA 1990 and updated HI admission assumptions.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

Table 11

HI, SMI and OASDI Outgo as a Percent of Taxable Payroll a/
1990-2060
(1990 II-B Assumptions)

Calendar Year	Program Outgo as a Percent of Taxable Payroll <u>b/</u>			
	HI	SMI	HI and SMI	OASDI
1990	2.56	1.82	4.38	10.60
1995	2.90	2.17	5.07	10.67
2000	3.42	2.94	6.36	10.56
2005	3.82	3.67	7.49	10.59
2010	4.34	4.29	8.63	11.08
2015	5.07	4.81	9.88	12.25
2020	5.73	5.44	11.17	13.86
2025	6.48	6.15	12.63	15.33
2030	7.13	6.76	13.89	16.28
2035	7.53	7.09	14.62	16.62
2040	7.72	7.22	14.94	16.55
2045	7.80	7.27	15.07	16.52
2050	7.90	7.40	15.30	16.70
2055	8.00	7.59	15.59	17.00
2060	8.11	7.81	15.92	17.23

a/ Estimates reflect HI and SMI changes enacted in OBRA 1990 and updated HI admission assumptions.

b/ Taxable payroll used for HI and SMI reflects the OBRA 1990 increase in the HI taxable earnings base (to \$125,000 in 1991) while taxable payroll used for OASDI reflects the OASDI taxable earnings base (\$53,400 in 1991). Estimates for the two programs are not additive because of the difference in the taxable earnings bases for the two programs.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

another method of showing the long-range cost of SMI. The costs are a larger share of taxable payroll than of GNP because taxable payroll accounts for only part of total national income. The patterns of cost increase over time are similar, however.

2. SMI premiums as a share of the average OASDI benefit paid to the elderly

For the vast majority of the elderly, the SMI premium is deducted from their Social Security (OASDI) cash benefits before the monthly benefits are paid. With no further changes in the law, the SMI premium is scheduled to increase by the cost of living adjustment (COLA) in OASDI benefits after 1995. However, in the recent past and through 1995, *ad hoc* changes in the law have set the premium to cover 25 percent of SMI costs for the elderly. It is useful to project this measure of SMI burden on the elderly under two assumptions about how the premium will be adjusted in the future: by the Social Security COLA; or by maintaining the premium to cover 25 percent of the SMI cost for the elderly.

If the premium continued to be set to cover 25 percent of SMI costs for the elderly, then it would be a growing share of their Social Security benefits. For example, in 1990 the premium is 5.2 percent of the average Social Security benefit paid to retired workers. By 2000, it would be 9.4 percent, and by 2010 it would be 13.4 percent of the average retired-worker benefit. (Table 12) On the other hand, if premiums rise only by the COLA in OASDI benefits after 1995, the share of their cash benefits that the elderly pay will not increase. Instead, the burden on general revenue taxpayers would rise even more rapidly than the costs of the SMI program as discussed below.

3. SMI costs net of estimated premium income as a share of GNP and as a share of HI taxable payroll

These measures indicate the share of SMI costs that would be borne by general taxpayers under alternative assumptions about whether SMI premiums are adjusted by the Social Security COLA or by the increasing cost of SMI. (Table 13) If the premium continued to cover 25 percent of SMI costs for the elderly, then the cost borne by general taxpayers would rise at the same rate as

Table 12
 SMI Premium in Relation to the Average Retired-Worker
 Benefit and to SMI Costs Under Two Assumptions
 About Premium Increases After 1995, 1990 - 2060

Calendar Year	SMI Premium		Premium Income
	(in current dollars)	As Percent of Ave. Retired-Worker Ben.	As A Percent of SMI Costs
	Premium Set at 25 Percent of SMI Costs		
1990	\$28.60	5.2	24.5
1995	46.10	6.6	24.2
2000	82.50	9.4	25.0
2005	131.50	11.9	25.0
2010	188.50	13.4	25.0
2015	243.50	13.5	25.0
2020	310.50	13.3	25.0
2025	398.60	13.3	25.0
2030	518.60	13.5	25.0
2035	681.60	13.9	25.0
2040	894.30	14.3	25.0
2045	164.20	14.5	25.0
2050	509.30	14.6	25.0
2055	963.40	14.7	25.0
2060	2572.80	14.8	25.0

	Premium Adjusted by Social Security COLA		
1990	28.60	5.2	24.5
1995	46.00	6.6	24.2
2000	56.20	6.4	17.0
2005	68.20	6.2	13.0
2010	82.90	5.9	11.0
2015	100.80	5.6	10.4
2020	122.60	5.2	9.9
2025	149.10	5.0	9.4
2030	181.50	4.7	8.8
2035	221.00	4.5	8.1
2040	268.80	4.3	7.5
2045	327.10	4.1	7.0
2050	398.00	3.8	6.6
2055	484.20	3.6	6.2
2060	589.10	3.4	5.7

a/ The \$28.60 premium is 25 percent of SMI per capita costs of the aged, but only 24.5 percent of total SMI per capita costs.
 Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, HCFA, December 1990

Table 13

SMI Non-Premium Outgo as a Percent of GNP and as a
Percent of HI Taxable Payroll under Two Assumptions About
SMI Premium Increases After 1995, 1990 - 2060

Calendar	SMI Non-Premium Outgo as A Percent of: a/			
	GNP		HI Taxable Payroll	
	25% Premium b/	COLA Premium c/	25% Premium	COLA Premium
1990	0.61	0.62	1.37	1.38
1995	0.78	0.79	1.62	1.64
2000	1.04	1.15	2.19	2.43
2005	1.29	1.50	2.74	3.18
2010	1.51	1.79	3.21	3.80
2015	1.67	2.00	3.59	4.29
2020	1.87	2.25	4.06	4.88
2025	2.10	2.54	4.59	5.55
2030	2.28	2.78	5.05	6.14
2035	2.37	2.91	5.30	6.49
2040	2.39	2.95	5.40	6.65
2045	2.39	2.96	5.43	6.73
2050	2.40	2.99	5.52	6.88
2055	2.44	3.06	5.67	7.09
2060	2.49	3.13	5.84	7.34

a/ Estimates reflect HI and SMI changes enacted in OBRA 1990.

b/ Future premium amounts assumed to be set to equal 25 percent of SMI costs for the elderly.

c/ Premium amounts after 1995 assumed to be adjusted by the cost of living adjustment (COLA) in Social Security cash benefits.

Source: Office of Medicare and Medicaid Cost Estimates, Office of the Actuary, December 1990

overall SMI costs; that is, it would roughly triple over the next 30 years as a share of GNP. On the other hand, if the beneficiary premium kept pace only with the Social Security COLA, the cost borne by general taxpayers would rise even more rapidly: as a share of GNP, it would nearly triple in only 20 years.

Measures for HI and SMI Combined

Because both parts of the Medicare program are so closely linked, serve essentially the same beneficiary populations, and, in some respects, cover substitutable services, it is important to have long-range projections of the combined costs of the Medicare program. In addition, it is useful to portray the total national resources that would be allocated to both Social Security and Medicare under current projections. The OASDI Trustees Report includes in an appendix projections of the OASDI and HI programs combined.

The Panel recommends that:

the HI Trustees Report include projections of the combined costs of HI and SMI over the 75-year projection period; and

the OASDI Trustees Report supplement projections of OASDI and HI as a percent of GNP, with projections of OASDI, HI and SMI as a share of GNP over the 75-year period.

Table 10 shows that over the next 35 years the total cost of Medicare as a share of GNP nearly triples from just under 2 percent in 1990 to about 5.8 percent in 2025. If Social Security is added as well, the total cost of both entitlement programs for the elderly nearly doubles from 6.5 percent of GNP in 1990 to about 12 percent in 2025. By 2060, the projected share of GNP for these two programs is about 13.3 percent.



VI. ALTERNATIVE SOLUTIONS

Introduction

In Chapter V we presented alternative methods for describing the status of Medicare. We showed, for example, that the HI Trust Fund is projected to become bankrupt around the year 2003 under the 1990 Trustees II-B assumptions. With the changes enacted in OBRA 1990, the HI fund is expected to be depleted about 3 years later. We also showed that if the HI Trust Fund were to be in balance over the 75-year projection period, payroll taxes today would have to be increased by about 3 percentage points. If, on the other hand, the HI tax rate were unchanged, however, then the HI fund could be brought into balance over the 75-year period if costs over the period were reduced by about half.

Since the SMI program is funded with a combination of general taxes and premiums, it is somewhat more difficult to describe the long-range status of that trust fund. However, the nature of the current obligations can be shown by pointing out that if the SMI program were funded solely through the payroll tax, then the cost of SMI would be about 5.4 percent of HI taxable payroll in 2020 and about 7.8 percent in 2060. Another way of showing this obligation is to point out that the percent of GNP that would go to the SMI program would increase from .8 percent in 1990 to 3.3 percent in the year 2060. Furthermore, total Medicare costs (HI and SMI combined) as a share of GNP will more than triple, from 2 percent in 1990 to 6.8 percent in 2060.

These summary measures indicate that the Medicare programs will absorb a significant magnitude of society's resources. As we indicated in Chapter III, these summary measures are based on an assumption that the rate of growth in hospital and medical costs will slow down in the future. That is, after the first 25 years of the projection period, hospital costs per admission under HI are projected to rise at the same rate as average wages in the overall economy, and per capita medical costs under SMI are projected to rise at the same rate as GNP. These ultimate assumed growth rates are lower than historical experience and, as noted in Chapter III, could understate the long-range cost of Medicare if the increase in per capita costs continue to out pace the growth in the economy.

The Panel concluded that the current state of the Medicare program is precarious, and that the *status quo* cannot be maintained. It, therefore, concludes that policy makers will have to make a number of difficult choices about how to bring the HI Trust Fund into balance and how to control the increasing costs of the SMI program. Based on this initial finding of the Panel, the Chair of the Advisory Council on Social Security asked the Panel to include in our report a series of options, but not recommendations, for policy makers to consider as they decide what to do with the funding of the Medicare program and the scope of benefits it offers. In considering this range of policy options, we reaffirm our finding in Chapter II that the Medicare program represents long-term obligations being incurred by both workers and beneficiaries. To secure stable long-term financing will require balancing the fairness of the burden that is to be borne by beneficiaries and by working-age tax payers both now and in the future. In this regard, we note that today's beneficiaries contribute roughly a quarter of the financing of the total benefits paid by Medicare. For SMI services, the premium beneficiaries now pay is about 25 percent of SMI costs. For HI benefits, OAct estimates that, for an average worker reaching age 65 in 1990, the present value of past HI contributions (paid by the worker and employer) is roughly one fourth of the present value of the worker's future HI benefits. (More information about this estimate is in Appendix G.)

In this chapter we outline a number of policy options that could be considered. We begin with a brief discussion of why it makes sense to think of the HI and the SMI program as a single program with multiple funding sources rather than as two separate programs with different funding sources. Although that is the way that many people think about the programs today, there are some policy options that can only be considered if the programs were truly merged. Therefore, we asterisk (*) those options that would require a merging of the programs. We then discuss a series of options that would increase revenues for the Medicare program and review initiatives to constrain costs by changing Medicare payment methods. We go on to consider a number of options that change the scope of the benefits. These range from options that change the Medicare eligibility age or beneficiary cost sharing requirements to ones that reflect a more radical change in the nature of the program. The options are not necessarily mutually exclusive.

Merging HI and SMI

When the Medicare program was first established, the hospital played the critical role in the health care sector. It was the doctors' workshop and was the setting in which the most important health care technologies were based. All major and many minor surgical procedures were done in hospitals. A hospital episode was a costly event and often quite self-contained. Patients entered the hospital a few days before surgery and usually received the necessary diagnostic tests at that time. After surgery, or after being stabilized for acute medical conditions, patients recuperated in the hospitals until they were ready to be discharged home. The majority of patients seen in the hospital were treated as inpatients; consequently, within the hospital, inpatient activity greatly overshadowed outpatient activity. Given the central and unique role of the hospital in 1965, Medicare was established to include a hospital insurance program and a separate, voluntary supplementary insurance program to cover physician and other non-institutional services -- each with its own funding sources.

Since 1965 the role of the hospital in the health care system has been significantly modified. Although it is still the prime locus of new technology, it faces competition from free standing diagnostic centers, clinical labs and multi-specialty group practices. Surgical procedures which once could be performed only in the hospital inpatient setting, are now being routinely performed in hospital ambulatory surgery sites, in free standing surgical centers and even in doctors' offices. The nature of an episode of care has changed, and services that were once provided during the inpatient stay are being provided in the outpatient setting prior to admission and in the home and other institutional environments following discharge. In 1970, 90 percent of the hospital's revenues derived from inpatient activity. By 1989 this had decreased to 74 percent.¹⁹ It is expected that hospitals will continue to receive a growing share of their revenues from outpatient services.

¹⁹ *Hospital Outpatient Services Background Report*, Report to Congress C-90-2, Prospective Payment Assessment Commission, Washington, D.C., 1990.

This changing role of the hospital is reflected in the Medicare data shown in Table 3. In 1970, 4 years after the inception of the program, HI accounted for 70 percent of all Medicare expenditures; in 1980 it accounted for 69 percent and in 1989 for 59 percent. By 2010 HI is projected to account for about 50 percent of Medicare expenditures (table 10). A higher proportion of Medicare payments to hospitals are being paid for outpatient services. In 1980, about 7 percent of Medicare payments to hospitals were for outpatient services while in 1989 this had increased to over 11 percent.

Although the Medicare program makes a clean distinction between Part A and Part B services -- particularly in terms of their source of funding -- this distinction is of less interest to people who are concerned with the utilization of services. The Health Care Financing Administration is increasing its capacity for integrating Part A and Part B files so it can study the overall utilization of health care services. Health analysts have started to examine episodes of care and view hospital care as just one of the medical components of the total care rendered during the episode. In the context of health care delivery in the 1990s and the 21st century, the establishment of separate funding schemes and cost sharing rules for hospital inpatient and other services seems somewhat anachronistic.

The Panel, therefore, suggests that policy makers consider formally integrating the two programs. The funding sources for the merged programs would continue to be a blend of payroll taxes, income taxes, other taxes, premiums and beneficiary cost sharing. The summary measures of financial status of the new program would obviously depend in part on the particular combination of taxes that is to be used.

Policy Options

In our discussion of possible options, we have assumed that the government will continue to offer a health benefit program that will cover most aged and disabled Social Security beneficiaries. Nevertheless, a number of the options would result in higher costs for beneficiaries, particularly for those with higher incomes.

We realize that quite different approaches to providing health insurance for the elderly have been proposed; for example, one such proposal would be to give individuals tax credits to set up medical retirement accounts, which they would then use to purchase health insurance in their old age. We also realize that there is interest in implementing a National Health Insurance (NHI) program. Under some NHI models, the Medicare program would be folded into the overall program and the same rules would cover everybody. For the purpose of this discussion, we are assuming that Medicare will not be folded into such a system.

We also recognize that the phenomenon of rising health care costs is not unique to the Medicare program. As noted in Chapter I, while Medicare has grown from 0.7 percent to 2.0 percent of GNP since 1970, total national expenditures for health care grew from 7.3 to 11.6 percent of GNP. We recognize that attempts to constrain the growth of health care costs by changing payment systems, methods of service delivery, or the development and utilization of new technology may be more effective if implemented universally rather than through only one payment system, such as Medicare.

Our set of options, therefore, is not exhaustive; rather, it is a listing of some of the choices that policy makers can consider to deal with the projected cost of the Medicare program. It is our intention to lay out options, not to make recommendations. However, the panel does recommend that policy makers should consider options for improving the financial status of Medicare not solely in terms of annual budget policy, but rather in terms of structuring the best possible health program for the aged and disabled given the amount of resources society is willing to allocate to it.

For this discussion we have categorized the options as follows: (1) increasing revenues; (2) changing payment methods; (3) raising the age of eligibility; (4) increasing beneficiary cost sharing; (5) changing the nature of covered services.

Increasing Revenues

Options that would increase revenues to the Medicare program include: changing FICA taxes; treating all or part of employer

financed health benefits as taxable income; treating more of Social Security benefits as taxable income; and imposing excise taxes on items related to health care utilization. The first three options would **change FICA taxes** paid by employees and employers.

a. Further increase the HI taxable wage base. The OBRA 1990 legislation raised the HI taxable earnings base to \$125,000 in 1991. This level is estimated to encompass about 95-96 percent of aggregate HI covered payroll. Thus, totally eliminating the limit on HI taxable earnings would increase HI revenue by about 4-5 percent. This would be a straightforward way of increasing HI revenues. The proportion of covered earnings paid into the HI program would be the same at all levels, rather than declining at higher earning levels, as at present. However, it could reduce support for the HI program, particularly among upper income earners and their employers, as they perceive it to become less of a contributory program and more of an income redistribution program.

b. Raise the HI tax rate. At present the HI portion of the FICA tax rate, paid by employees and employers each, is 1.45 percent of earnings up to \$125,000. In addition, employees and employers each pay the OASDI tax of 6.2 percent of earnings up to \$53,400. This option would raise the HI rate above its current level of 1.45 percent, and thereby raise the total FICA tax above the current rates of 7.65 percent on earnings up to \$53,400, and 1.45 percent on earnings from 53,400 to \$125,000. The next option is a variation on raising the HI tax rate.

c. Reduce the share of FICA taxes allocated to OASDI and shift part of the OASDI payroll tax to HI. In the next two decades, the OASDI tax rate is more than the amount needed to meet the annual cost of OASDI benefits. Consequently the OASDI trust fund is building large reserves. While OASDI revenues from both employees and employers are about 12.4 percent of taxable payroll, OASDI benefit costs over the next two decades are just over 10 percent of taxable payroll. But after 2010, OASDI costs are projected to rise to about 16.3 percent of taxable payroll by 2030. Some have advocated shifting OASDI closer to a pay-as-you-go financing rather than continuing current policy. Shifting OASDI to pay-as-you-go financing would mean lowering the OASDI tax rate during the next two decades and, sometime after 2010, either

raising the OASDI tax rate or changing benefits to slow the growth in OASDI costs, or both. Some have proposed that, if OASDI is shifted to pay-as-you-go financing, the reduction in the OASDI tax over the next two decades be offset by an increase in the HI tax so that the total FICA tax during that period would not be reduced. This change would delay the depletion of the HI Trust Fund. It, alone, would not alter the ultimate combined cost of OASDI and HI.

The following three options are various ways to **treat the value of employer-financed health insurance as taxable income** to those who receive the benefits.

d. Treat some or all of employer-provided health insurance as taxable compensation of employees: Under current tax rules, employer contributions to employee health insurance benefits are counted as a tax-deductible business expense to the employer and are not counted as taxable income to the employee. Treating part or all of these fringe benefits as taxable compensation would increase income and FICA taxes paid by employees and increase FICA taxes paid by employers. There is considerable interest in changing the rules governing the tax exclusions for employer-provided health insurance or other benefits, as well as for health care spending accounts that have been established by some employers. Some policy analysts would limit the value of the health insurance benefits that is excluded from taxation; whereas others would eliminate the tax exclusion entirely but use the increased income from tax revenues to provide tax credits for health insurance and/or to finance health care for the currently uninsured. If the tax exclusions rules were changed, the HI revenues resulting from the increased FICA tax base would be allocated to the HI program.

e. Tax the value of employer-provided retiree health benefits and allocate the additional revenue to Medicare: Like employer-financed health benefits for active employees, employer-financed health insurance benefits for their retirees are not treated as taxable income to those who receive the benefits. Retirees collect many retirement benefits. They receive pensions that are counted as taxable income and health insurance benefits, which, while they increase the retiree's real income, are not taxed. Clearly an individual who has \$20,000 in income and \$2,000 in retirement

individual who has \$20,000 in income and \$2,000 in retirement health benefits is much better off than a person who has \$20,000 in income and purchases a supplementary health insurance policy for \$2,000, yet the taxes they pay are the same. Under this policy option, all income, whether in money or in kind, would be treated as taxable income. Under this option, the additional income tax revenue would be earmarked for the Medicare program.

f. Count 50 percent of the insurance value of HI benefits as taxable income to those enrolled in the program and allocate the income tax revenues to the HI Trust Fund. Employees currently pay income taxes on their share of the HI tax, but not on the employer's share. This policy would treat the value of HI that is financed from untaxed employer contributions as taxable income under the tax code. This policy would not have an adverse impact on low income Medicare beneficiaries, since they, like other low income Americans, pay little or no income taxes. If the value of HI is measured as benefit expenditures per enrollee, it would be about \$2,000 in 1990. To treat half that amount as taxable income would increase by about \$1,000 the taxable income of persons enrolled in HI. Also, the part of the value of SMI coming from general revenues could be taxed, about \$1,000 per beneficiary per year in 1990.

The next option would change the **tax treatment of Social Security cash benefits** and allocate the increased revenue to HI.

g. Increase the share of OASDI benefits that is subject to the income tax and allocate the revenue to the HI program. Under current law, up to 50 percent of Social Security benefits are subject to the personal income tax for beneficiaries with incomes above certain thresholds. The revenue from taxation of benefits goes to the OASDI Trust Fund. The income thresholds are \$25,000 for an individual and \$32,000 for a couple and are not indexed. Some have proposed to increase the taxation of benefits by lowering or eliminating the income thresholds. These options would increase the income taxes of beneficiaries with incomes below the current thresholds.

Others have suggested keeping the current thresholds, but increasing the share of benefits subject to taxation. For example, some

Security benefits more like other pensions are treated. Other pensions are taxed to the extent that they exceed the value of the employees' own past pension contributions, in nominal dollars (without adjusting for inflation or real interest earnings on those contributions). It is estimated that subjecting about 85 percent of Social Security benefits to the income tax would be consistent with this policy. Keeping the current thresholds and taxing a larger share of benefits would increase the taxes of upper income beneficiaries.

New revenues from taxing more of Social Security benefits could be allocated to the Medicare program instead of to the OASDI Trust Fund.

The final revenue enhancing option would impose excise taxes on certain items related to health care utilization.

h. Federal excise taxes. Studies have shown that where extensive "Medigap" coverage exists, Medicare utilization is higher.²⁰ Medigap insurance policies -- whether individually purchased or employer-financed as part of retiree benefits -- supplement Medicare and cover some or all of the beneficiary cost-sharing features built into the Medicare program. Some have suggested imposing excise taxes on Medigap policies, partially to offset the increase in utilization engendered by the supplemental coverage. If such an excise tax is adopted, it should apply consistently to policies purchased individually and to those offered by employers to their retirees.

An alternative to the excise tax proposal is to limit by Federal law or regulation the benefits that Medigap policies can cover. For example, Medigap policies might be forbidden to cover the Medicare deductible and coinsurance amounts up to some catastrophic limit. Currently, filling in the deductible and coinsurance may encourage excessive utilization by Medicare beneficiaries. Risk averse Medicare beneficiaries frequently will buy multiple coverage to eliminate the possibility of out-of-pocket expenses. Problems in regulation and

²⁰ Christensen, Sandra, Stephen H. Long and Jack Rodgers, "Acute Health Care Costs for the Aged Medicare Population: Overview and Policy Options, *Milbank Quarterly*, 65:3 pp. 397-425, 1987.

possibility of out-of-pocket expenses. Problems in regulation and control of Medigap policies, particularly those individually purchased, are significant and ongoing.

Changing Payment Methods

Medicare cost containment strategies over the past several years have been designed to provide incentives to providers to improve the management of health care. Frequently this involves establishing a payment amount for a specific service or set of services. If the provider can provide care at less than the amount, the provider keeps the savings; however, if care costs more, the provider pays the difference. For most Medicare health maintenance organizations (HMOs) and competitive medical plans (CMPs) this amount is paid in advance, or prospectively, on a monthly basis, for every Medicare beneficiary who enrolls. The HMO or CMP is responsible for providing all Medicare covered benefits in exchange for the monthly payment from HCFA. This prepayment system was authorized by law in 1982 and implemented in 1984.

The Medicare prospective payment system (PPS), which was enacted for most short-stay hospitals in 1983, is based on similar principles. Under PPS, hospitals are paid a fixed rate per case, currently based on 471 diagnosis-related group (DRG) categories. This system provides incentives for hospitals to be more efficient in their health care delivery, thus containing costs. If the hospital can provide services at less cost than the DRG payment, the hospital retains the difference. Under PPS, the average length of stay for all DRGs declined from 9.8 days in 1983 to 8.9 days in 1988, a drop of 9 percent.

Aiming to build on the experience of the hospital PPS, Congress has required HHS to develop prospective payment systems for hospitals that are now exempt from PPS, for ambulatory care and outpatient departments, for home health agencies and for skilled nursing facilities. For example:

- o OBRA 1986 required HHS to develop a patient classification system that can be used for an outpatient prospective payment system. OBRA 1990 amends the 1986 requirements to require

need to provide for appropriate limits on increases in expenditures under the Medicare program." The outpatient PPS proposal is to be reported to Congress by September 1, 1991.

- o OBRA 1990 also asks for the following reports to Congress on the development of prospective payment systems:

non-PPS hospitals
skilled nursing facilities
home health agencies

April 1, 1992
September 1, 1991
September 1, 1993

Congress also mandated under OBRA 1989 a revision to the physician payment method. The revision alters the previous reimbursement principle of paying "reasonable charges" to a fee schedule based, in part, on a resource based relative value scale. The schedule sets a payment rate for a physician procedure that reflects the product of the relative value, a geographic adjustment factor for each locality and a conversion factor to insure that the payment is budget neutral. To control an increase in volume, a Medicare volume performance standard will be established.

HCFA is also investigating a payment concept known as "bundling," that aggregates current payments for discrete services into one bundled payment. This concept would tend to reduce fragmented billing but also promote efficient management of an episode of care. For example, one payment could be paid to an institutional provider for services that involve hospitalization and post-hospitalization services or that involve only post-hospitalization services that cross institutional settings. As another example, a bundled payment could be made for specific surgical procedures. HCFA is about to test this concept for Coronary Artery Bypass Grafts and is considering applying this concept to other high-cost, high-volume procedures such as cataract extractions.

With prospective payment systems in place, the Federal government can effectively control increases in provider reimbursement rates. As noted in Chapter III, this has been done with the hospital payment rate under PPS. On an *ad hoc* basis, Congress has set the payment rate below the full increase in the hospital market basket in every year from 1986 through 1993.

The incentives built into these systems are intended to control Medicare costs, but providers could also respond to these incentives by: diverting care to other provider settings, e.g., from inpatient to outpatient settings; maintaining revenue by increasing the number of events for which the provider can be reimbursed; shifting costs to other payers; or reducing beneficiaries' access to providers' services or under serving patients in attempts to minimize costs. Such behavior may increase costs in other settings for which appropriate cost containment mechanisms are not in place or may have undesirable effects on beneficiaries. Cost containment strategies which involve global payments, or bundling, and that build in mechanisms to control unnecessary increases in volume may help to achieve the desired objective of cost control.

Raising the Medicare Eligibility Age

When the Medicare program was first enacted, people became eligible for Medicare at the age of 65, the age at which they were eligible for full Social Security benefits. However, as a result of the Social Security Amendments of 1983, the age at which full Social Security benefits are paid will gradually rise from 65 to 66 for those reaching age 62 between 2000 and 2005 and then will rise again from 66 to 67 for those reaching age 62 between 2017 and 2022. Therefore, one option would be to:

Raise the eligibility age for Medicare to make it consistent with the age of eligibility for full Social Security benefits.

The Panel is aware that, in spite of improved health and increased longevity, the age at which people retire is not yet increasing. Thus, if the age at which one is eligible for Medicare is raised, not only would the cost to employers for their retiree health benefits increase but also a number of retirees who are not covered by employee plans would be without health insurance or would be able to buy health insurance only at exorbitant rates. Therefore, if this option is implemented, the panel recommends that policy makers consider making Medicare policy consistent with Social Security policy. Potential Medicare beneficiaries could be allowed to buy into Medicare at the same age that they are eligible for actuarially reduced Social Security benefits.

OAct has estimated that if Medicare coverage was voluntary at ages 62 to 67, the premium needed to cover the full cost of HI and SMI would be roughly \$400 to \$500 a month. That is based on assumptions that the premium is not subsidized and enrollment is voluntary and continuously open with no pre-existing condition exclusions. Under these circumstances it is estimated that only persons who are sicker than average and lack employer group coverage would enroll. If the premium were federally subsidized, a larger and healthier group would enroll, thereby spreading the risk. The premium could be significantly lower depending on the degree of subsidy. (More information on the estimated premium is at Appendix H.)

Increasing Beneficiary Cost-Sharing

There are a number of options that could be followed to increase beneficiary cost sharing. They include:

- o Change the Medicare deductible
- o Raise the SMI premium
- o Shift Medicare to a modified catastrophic plan

We do not suggest any policy options to increase the SMI coinsurance beyond the current 20 percent rate because it is typical of most private insurance programs and there is some balance billing.²¹

²¹ Balance billing may occur with physicians who do not accept assignment from Medicare. Physicians who accept assignment agree to accept the Medicare approved payment as payment in full. The patient pays the 20 percent coinsurance rate on the approved amount. Physicians who do not accept assignment may charge patients an additional amount in excess of the Medicare approved payment rate. This is known as balance billing. The patient is responsible for the 20 percent coinsurance on the approved fee, plus the balance billed by the physician. The amount physicians may charge is limited to 125 percent of Medicare allowable charges in 1991, declining to 115 percent of allowable charges in 1993.

a. Change the Medicare deductible (*). Deductibles serve three major functions: they decrease the cost of the Medicare program to the government; they decrease the costs associated with processing a large number of small claims; and they decrease utilization. However, a hospital deductible does not serve this third function very well, since hospitalization is often beyond the control of many beneficiaries. Medigap insurance that covers the Medicare deductible weakens the disincentive for excessive utilization of services that are under the beneficiary's control.

One major policy change would be to implement a deductible policy that would be expected to control utilization. One such policy would be to (a) integrate the HI and the SMI programs, (b) impose a single deductible which in magnitude is between the level of the HI and the SMI deductibles, and (c) impose a tax on (or outlaw) Medigap policies or employer-financed retiree health policies that cover the deductible, as discussed in earlier options.

If the HI and SMI programs are not combined, an increase in the SMI deductible could be considered. While the HI deductible has been increased each year since 1968, the SMI deductible has not. When the Medicare program began in 1966, the SMI deductible was \$50. It was raised to \$60 in 1973 and to \$75 in 1982. OBRA 1990 raised it to \$100 in 1991. Even with this change, the SMI deductible is less than it would have been if it had been adjusted to keep pace with inflation since the Medicare program began. If the SMI deductible were adjusted by changes in the CPI since 1965, it would be about \$200 today, while if it had been adjusted by changes in medical care prices it would be roughly \$300.²²

b. Raise the SMI premium. When the Medicare program began, the SMI premium was set to cover 50 percent of the cost of the SMI program (which then covered only the elderly). If the premium were returned to 50 percent of SMI costs for the elderly, it would be twice what it is today, or about \$60 in 1991, instead of

²² The average annual consumer price index for all urban consumers (CPI-U) rose from 31.5 in 1965 to 124.0 in 1989, while the medical care component of the CPI-U rose from 25.2 in 1965 to 149.3 in 1989. Source: *Social Security Bulletin*, December 1990, Table M-39.

\$29.90. Through 1995 premiums are expected to cover 25 percent of SMI costs. As noted in Chapter V, with no further change in the law, the SMI premium will rise with the cost-of-living increase in OASDI benefits after 1995, and consequently will increasingly fall short of meeting 25 percent of projected SMI costs.

c. Shift Medicare to a modified catastrophic coverage plan. This type of option would shift the primary role of Medicare to that of protecting beneficiaries against extraordinary out-of-pocket health care expenditures for services now covered by Medicare. Such extraordinary, or catastrophic, expenditures could now occur if a patient required long-term hospitalization (for which HI coverage is now limited to 90 days per benefit period, with the patient responsible for daily copayments after the first 60 days of care²³) or if the patient had very costly bills for medical or other outpatient services (for which the beneficiary is now responsible for the 20 percent coinsurance on Medicare allowable charges and any allowed balance billing, without a limit on total out-of-pocket costs). In return for more complete protection against catastrophic out-of-pocket costs, the beneficiary would be responsible for larger initial cost sharing in the form of a larger deductible and/or premium. A catastrophic plan could be combined with: 1) mandatory assignment for providers to limit beneficiaries' out-of-pocket payments for charges in excess of Medicare approved rates; and 2) Federal requirements that Medigap policies not cover some or all of the initial Medicare deductible.

A variation on the option of shifting Medicare to a catastrophic coverage plan would be to extend Medicare coverage to items not now covered -- such as outpatient prescription drugs or long-term care services -- in exchange for a higher deductible and/or premium than would be required under the current basic plan.

Another variation on the catastrophic coverage idea would be to define the catastrophic limit on the beneficiary's out-of-pocket expenses in relation to the beneficiary's ability to pay. For example, the limit for a year could be set in relation to the beneficiary's adjusted gross income as reported for income tax purposes

²³ The patient is also allowed a lifetime reserve of an additional 60 days in a benefit period.

for the year. In this way, the "catastrophe" being insured against is the financial catastrophe that occurs when health care bills are large in relation to current income. This variation would reflect the fact that a deductible that is affordable to a relatively well-off person could be a financial disaster to a lower income person who does not qualify for Medicaid benefits.

Changing the Nature of Covered Services

The defined Medicare benefit package has changed very little since it was implemented in 1965. The definition of physicians has been broadened and hospice care, outpatient physical therapy and speech pathology have been made covered services. In contrast, the nature of covered services has changed dramatically through the regulatory process. As new medical devices, types of durable equipment and new treatments such as heart and liver transplants become available, HCFA must decide whether these items should be covered. The coverage process has traditionally been based on whether these services are technically effective, although increasing attention is being devoted to whether they are more effective than lower cost available alternatives. Once services have been covered, there has been little control over their utilization.

The Panel notes that there is a significant Federal research commitment to effectiveness research: research designed to determine to what extent services are effective and for whom. At the same time there is serious attention given to developing methods for utilization management; utilization management can be seen as the implementation arm of the effectiveness initiative. Also, a separate research focus is quantifying and analyzing the extent of medically unnecessary services and their related charges in the delivery system. All of these initiatives, when appropriately structured and implemented, will lead to a decrease in the inappropriate use of health care services. To the extent that the health care delivery process can be streamlined, some portion of the health care financing issues described in this document are mitigated. Unfortunately, these initiatives may not be completely effective without a radical change in the entire delivery system structure, if then. In light of the difficulty of effecting such radical change and the

urgency of the need, the following present some options to be considered that change the nature of the benefits. They include:

- o Performance-based certification of providers
- o Beneficiary choice of different levels of resource-intensive Medicare programs
- o Selective contracting with managed care programs
- o Purchase of private health insurance using a fixed contribution from the Federal government.

The Panel recognizes that these represent progressively more effective ways of controlling expenditures, but progressively more difficult choices in terms of their impact on beneficiaries.

a. Performance-based certification of providers. The Medicare program introduced performance-based certification of providers when heart transplants were made a Medicare covered benefit. Heart transplants were covered only in transplant centers which met certain criteria. To be considered as a covered provider, a certain percentage of the patients receiving transplants had to survive at least one year. This policy is intended to serve two quite different purposes: (1) It should ensure that the quality of care is such that more people will survive the procedure; and, (2) it should ensure that people who are too sick to benefit will not be included in the candidate pool.

One option would be to extend the concept of performance-based providers to cover a larger number of elective procedures, especially as outcome measures begin to be identified. For example, a set of procedures could be identified that have an elective component to them. Among such procedures would be hip replacements, cataract surgery and coronary bypass surgery. Under a performance-based system, for example, a center would only be covered for coronary bypass surgery if a specified percentage of the relevant age cohort undergoing such procedures survived for at least a year. Patient cohorts would be defined in 10-year increments (65-75, 75-85 and 85 plus). This is similar to "centers of excellence" networks set up for some insurance carriers and HMOs.

This policy would represent a radical change in the Medicare program, and would be reflective of a policy that indicated that some services were reasonable and necessary only if beneficiaries were expected to receive long-term benefits from them.

b. Beneficiary choice among different levels of resource-intensive benefit plans (*). Individuals have very different preferences about medical care services. To take the extreme: some people want to have everything done for them no matter what, whereas other people write living wills or durable powers of attorney in order to avoid receiving medical care services which to them have little value. These types of choices have implications for the cost of the Medicare program. One option that policy makers could consider would be to design different types of Medicare programs: beneficiaries could choose among them, but they would have to pay some of the additional cost of the higher cost program. Two different types of choices are discussed below.

One set of choices would allow beneficiaries to choose between a Medicare program (Medicare A) which, by design, explicitly does not cover all intensive services that could be received at the end of life. Explicit examples would include transfer to a hospital for treatment of pneumonia for people who are impaired in all activities of daily living and care on a respirator in an intensive care unit for people who are unlikely to recover. A second Medicare program (Medicare B) program would be the status quo. Medicare A's premium would be lower than Medicare B's, and would partly reflect the difference in the cost of the two programs. Beneficiaries could choose between the programs once every 5 years as technologies and benefit descriptions change. Some provision may be needed, however, to protect the system's financing against adverse selection, whereby beneficiaries would shift to the high intensity, higher cost system only when they anticipate the need for higher intensity services. The States would choose between the programs on behalf of Medicare beneficiaries who are covered by Medicaid.

An alternative set of approaches would be to have Medicare offer a choice between a high tech program (Medicare C) and a low tech program (Medicare D). A number of specific technologies that are costly relative to their effectiveness -- such as bone marrow, heart, liver or lung transplants, or bone or joint replacements -- would be

covered only under the high tech program. The premium for D would be lower than that for C. Under this option, people could choose either C or D; however, in order to avoid adverse selection problems, once they had chosen D they could never choose C. Again the States could decide which of the two policies to purchase for the beneficiaries who are also covered by Medicaid.

If these options were followed, there may need to be a change in employer retiree health benefits. If employers offer Medigap type policies, they may want to cover only the gaps associated with the option the patient selected. Otherwise, substantial costs could be shifted to employers as a result of the retiree's selection of the low-cost Medicare option.

c. **Selective contracting with managed care organizations.** Even though Medicare has not been able to effectively utilize the HMO industry to contain costs in a major portion of the system (only about 4 percent of beneficiaries are in HMOs), the basic principles of health care management present an opportunity for Medicare. The more effective HMOs provide a laboratory for policy makers to learn how to effectively manage Medicare services. The Panel believes that HCFA should continue exploring enhanced health care management methodologies, expanding upon current HMO and preferred provider organization (PPO)²⁴ options.

One set of options would be for Medicare to negotiate exclusive provider arrangements with HMOs or PPOs for Medicare beneficiaries in a geographic area. Membership would be compulsory for Medicare beneficiaries in that area. Both the per capita cost of the plan and the level of services to be provided would be a subject of contractual negotiation between Medicare and a set of health care plans or providers. Negotiations could take one of two forms.

²⁴ In a PPO, an enrolled beneficiary can, at the point of obtaining health care services, use either a non-PPO provider or a provider who has contracted to participate in the PPO. The beneficiary is given an incentive to use the PPO providers, usually in the form of lower cost sharing. The contracting providers agree to discount their fees and adhere to the PPO's utilization management program.

Medicare could specify the services to be provided, and plans or providers seeking to win a Medicare contract would respond with bids. It is expected that the bids would be lower than the price of directly purchased services because the increase in volume experienced by the winning bidder(s) could allow the exploitation of economies of scale and because of potential savings from increasing the number of beneficiaries under managed care. As the current reimbursement rates to providers are reduced below current fee levels, it would become increasingly difficult to purchase global coverage of a Medicare population for less than the amount the Federal government already pays.

Another option is for Medicare to announce a price it is willing to pay. Plans or providers would bid with descriptions of the amount of services they would be willing to offer for that price or quote premiums for supplemental benefits. For either option, Medicare would have to determine whether the results meet minimum criteria: is the lowest bid financially feasible, in the first version, or is the best package of services acceptable, in the second version. The second option can achieve any desired level of cost containment, simply by specifying a price and asking providers to do as much as they can for that price. Of course, there is no intimation that the level of services is in any sense ideal or that it will be consistent from community to community. As with all proposed long term solutions, this method of limiting beneficiaries' choice of providers and negotiating reduced payments or services does not guarantee to control costs without running the risk of reducing the well-being or choices of Medicare beneficiaries.

d. Purchase private health insurance using a predetermined fixed contribution from the Federal government(*). Another cost containment measure would convert the current "defined services" Medicare program into one of a "defined contribution" or "defined dollars," with the dollars to be used on the insurance plan of the beneficiary's choice. In this arrangement, each Medicare beneficiary would be given a fixed Federal contribution representing the amount of his expected health care costs under Medicare. Such a change would put a fixed dollar limit on Federal costs per Medicare enrollee.

The beneficiary would take the Federal contribution, combined with private payments if desired, and purchase complete health care coverage from an insurance company or a health maintenance organization. However, a number of problems would have to be overcome.

For example, it would be administratively complex to calculate the appropriate size of the contribution for each individual. The contribution is supposed to represent what Medicare would have spent on a given individual, but that amount will be different for persons with different levels of expected expenditures. The amount might have to be adjusted to each person's age, gender and institutional status, as is currently done for HMO payment rates, and possibly health status.

If insurance companies are allowed to medically underwrite, individuals in average health would be easily insured, providing a profit for the insurer, while those in very poor health would be unable to attain coverage at any reasonable price.²⁵

From the beneficiary's point of view, a fixed contribution would allow maximum choice, (assuming some provider or insurer is willing to enroll him or her). It also puts tremendous pressure on the beneficiary to choose wisely when he may not have the information to do so. The government ought clearly to provide assistance in that choice. If beneficiaries are allowed to keep the value of the government's contribution as income, some may be uninsured.

The cost of providing Medicare services through such a system might exceed the costs of reimbursement for these services under Medicare. Under Medicare, the Federal government can set reim-

²⁵ Underwriting is the selection and rating of risks that are offered to an insurer. In the case of an individual seeking health insurance, an insurance company may require a health statement or, a medical exam, to be used to classify the person as a standard risk, substandard risk, or uninsurable. Those found uninsurable may be denied coverage. Those found to be at greater risk may be charged higher premiums and/or have limitations on the conditions covered by their insurance.

bursement rates. Unless changes are made, the private system would not have the same large market share as Medicare does to use as a basis for setting low reimbursement to providers. Finally any safety net, such as Medicaid might wind up absorbing much of the cost for those unable to purchase coverage, particularly in rural areas where coverage may not be available.

From the perspective of controlling Medicare costs, the amount of the Federal contribution could be set to reduce Federal expenditures for Medicare, but at the expense of a greater private burden, especially for those persons who wanted to buy more generous benefits.

Conclusions

Both the HI and the SMI components of the Medicare program represent political and social long-term commitments for present and future contributors and beneficiaries. The Panel has recommended that these long-term obligations should be clearly portrayed in the Medicare projections over the next 75 years. In this light, the most critical issues with regard to Medicare projections are: the projected depletion of the HI Trust Fund shortly after the turn of the century; the serious imbalance between revenues and costs of HI; and, the rapid growth in the cost of SMI.

The Panel has suggested that policy makers seriously consider integrating HI and SMI to better reflect the total size of the Medicare program, the changing role of the hospital and the varied ways in which services are provided for episodes of care. Such an integrated program could continue to be financed by a blend of payroll taxes, other revenues, beneficiary premiums and cost sharing.

While we have suggested a number of improvements in projection methods, assumptions and measures of the financial status of the Medicare program, our recommendations do not change the basic finding that Medicare faces serious financing problems, particularly early in the next century. The retirement of the baby boomers -- between about 2010 and 2030 -- and the subsequent movement of the baby boom into advanced old age will place a growing demand on the national resources needed to finance health care for the

elderly. The next few years offer a window of opportunity for policy makers to consider how best to meet that challenge. None of the options is easy. None can reduce cost without running the risk of reducing beneficiary well-being. All require a balance of fairness in the share of the burden that is to be borne by working-age persons and by the elderly themselves. The Panel recommends that major policy decisions about the design and financing of Medicare should be developed, not solely in annual budget negotiations, but rather from a long-term perspective that aims to design the best possible health benefit program for the elderly and disabled, given the resources that Americans are willing to devote to the purpose.

APPENDIX A

Description of Medicare Benefits

HCFA

FACT SHEET



Department of
Health & Human
Services

Health Care
Financing
Administration

MEDICARE

January, 1991

The Medicare health insurance program provides comprehensive acute-care coverage for people 65 and over and for certain younger people who are receiving Social Security disability benefits. Medicare also serves people of any age who have chronic kidney disease and need dialysis or kidney transplants. Medicare currently covers over 34 million people, of whom about three million are disabled and some 150,000 are kidney disease patients. The Medicare program has two parts: Hospital Insurance (Part A) and Medical Insurance (Part B).

HOSPITAL INSURANCE (Part A)

What's Covered?

The law limits Medicare coverage to services and items that are reasonable and medically necessary for the diagnosis and treatment of illness or injury. They include:

- Inpatient hospital services, including room, meals, nursing care, operating room services, drugs, medical supplies, laboratory tests, therapeutic rehabilitation services, and medical social services.
- Skilled nursing facility care for continued treatment or rehabilitation following hospitalization.
- Home health care services prescribed by a physician for treatment or rehabilitation of homebound patients, including part-time or intermittent nursing services.
- Hospice care for the terminally ill.

What's not covered?

- Medicare does not cover inpatient hospital or skilled nursing facility stays to provide custodial care (care that is primarily for the purpose of meeting personal needs: help in walking, bathing, dressing, eating).
- The Hospital Insurance program will not pay for personal convenience items such as televisions provided in hospitals or skilled nursing facilities, private-duty nurses or the extra costs of private rooms when not medically necessary.

Paying the Bills

In calendar year 1991, for the first 60 days of inpatient hospital care in a benefit period, Medicare pays all approved charges except for a \$628 deductible for which the beneficiary is responsible. For days 61 through 90, Medicare pays for all covered services except for \$157 per day coinsurance payments for which the patient is responsible. After 90 days, each beneficiary has 60 lifetime reserve days that can be used only once at a rate of \$314 per day. If a beneficiary has been out of a hospital and has not received skilled care in any other facility for 60 days, but is then readmitted to a hospital, a new benefit period begins and the beneficiary is again responsible for a \$628 deductible for the first 60 days of inpatient care.

In calendar year 1991, if services of a skilled nursing facility are needed for continued care of a patient after at least three consecutive days of hospital inpatient care, Medicare will pay for all covered services for the first 20 days. From the 21st through the 100th day, the beneficiary is responsible for paying \$78.50 a day. Medicare does not pay for skilled nursing facility care beyond 100 days in each benefit period.

Medicare will pay all costs for covered home health care, except a 20 percent coinsurance amount for durable medical equipment.

For terminally ill patients who elect that option, Medicare will pay all covered costs of care in a Medicare-certified hospice, except for small coinsurance amounts for outpatient drugs and inpatient respite care.

Funding and Budget

The Hospital Insurance Trust Fund is financed mainly from a portion of the Social Security payroll tax (the FICA deduction). The Medicare part of the payroll tax is 1.45 percent from the employee and 1.45 percent from the employer on income up to \$125,000.

MEDICAL INSURANCE (PART B)

What's Covered?

Medical Insurance helps to pay for physician services, outpatient hospital services (including emergency room visits, ambulatory surgery, diagnostic tests, laboratory services, outpatient physical therapy, occupational therapy and speech pathology services, durable medical equipment, rural health clinic services, and a variety of other health services and supplies.

What's Not Covered?

Generally, Medical Insurance does not cover routine physical examinations, preventive care, or services not related to treatment of illness or injury.

Screening Mammography and Pap Smear Tests

Screening pap smear and mammography examinations are exceptions to the rule against Medicare coverage of routine physical examinations. Effective July 1, 1990, Medicare started covering screening pap smear tests at intervals of three years for detection of cervical cancer. Beginning January 1, 1991, Medicare coverage was extended to screening mammography examinations every two years for women 65 and over, annually for women age 50 to 65, annually for women age 40 to 50 at high risk of developing breast cancer, and one time for women 35 to 40.

Paying the Bills

Medicare pays 80 percent of approved charges for most covered services after a beneficiary's payments for services have reached the annual deductible amount of \$100.

Funding and Budget

Persons enrolled in Medicare Part B pay a monthly premium. The premium established by Congress for calendar year 1991 is \$29.90. The general tax revenues of the federal government support approximately 75 percent of the program costs.

COORDINATED CARE

Medicare beneficiaries may have lower out-of-pocket costs if they choose to enroll in prepaid health care plans that participate in Medicare instead of receiving services under traditional fee-for-service arrangements. Approximately 75 percent of Medicare beneficiaries live in areas served by prepaid plans. Medicare enters prepayment contracts with health maintenance organizations (HMOs) and competitive medical plans (CMPs) to provide coordinated care to Medicare beneficiaries. Medicare pays the plans for all Medicare-covered benefits enrollees need. Many organizations offer additional benefits not covered by Medicare.

ENROLLMENT AND CLAIMS

Enrollment in Medicare is handled by the Social Security Administration. Claims for payments for services received are processed by insurance companies under contract with HCFA. Appeal procedures are available for persons whose claims have been denied or who are dissatisfied with the amount paid.

Contractors known as fiscal intermediaries make payments for Medicare Part A services provided by hospitals, skilled nursing facilities, home health agencies and hospices. Generally, payments made for inpatient hospital stays are based on the diagnoses of a patient's illnesses.

Carriers make Medicare Part B payments to physicians, suppliers or beneficiaries, depending on whether the physicians or other suppliers accept Medicare assignment. Physicians and suppliers are required to submit all Medicare claims to carriers, regardless of whether they accept assignment. By accepting assignment, physicians or other suppliers agree to accept Medicare's approved charges as payment in full for services. The beneficiary is responsible for 20 percent of the approved charge. Currently, the Medicare approved charge for a physician's service may not exceed the customary charge of the physician or the prevailing charge in the locality for that service, whichever is lower.

QUALITY OF CARE

Surveys and Certification

The Health Care Financing Administration maintains an extensive survey and certification program to ensure that providers and suppliers serving Medicare and Medicaid beneficiaries are complying with federal health and safety requirements. HCFA contracts with state survey agencies to conduct annual inspections of hospitals, nursing homes and independent clinical laboratories. Providers and suppliers that are not in compliance and fail to correct deficiencies are dropped from the Medicare and Medicaid programs.

APPENDIX B

Persons and Agencies Consulted

**PERSONS AND AGENCIES CONSULTED
BY THE HEALTH TECHNICAL PANEL**

1. Robert Eaton, Associate Administrator for Program Development, Health Care Financing Administration (HCFA)
2. Gayle Cozens, Associate Commissioner of Legislation and Congressional Affairs, Social Security Administration (SSA)
3. Anne Erfle, Acting Deputy Commissioner for Legislation and Congressional Affairs, SSA
4. Harry Ballantyne, Chief Actuary, SSA
5. Guy King, Chief Actuary, Office of the Actuary (OAct), HCFA
6. Sol Mussey, Director of Medicare Cost Estimates, HCFA
7. Don Muse, Analyst, Congressional Budget Office
8. Gordon Trapnell, President, Actuarial Research Corporation
9. Mark Freeland, Ph.D., Office of National Cost Estimates, OAct, HCFA
10. John Hambor and Jim Dugan, Department of Treasury
11. Dave Demers, Department of Labor
12. Steve Sandell and Gene Moyer, Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services

APPENDIX C

Hospital Insurance (HI) Contingency Reserves



DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care
Financing Administration

Memorandum

Date November 9, 1990

From Sol Mussey
Office of the Actuary

Subject Level of HI Trust Fund Assets Needed to Handle Adverse Contingencies

To Health Technical Panel

This memorandum is to discuss the appropriate level of the HI trust fund needed to adequately handle adverse contingencies. Many of the considerations made in the OASDI analysis would apply to HI as well. In particular, any adverse experience which affects OASDI income would affect HI income the same way. In terms of outlays, there are many different factors which affect the HI program compared to the OASDI program. While the general economic conditions do have an effect on the hospital market basket, there are other factors which are more specific to the hospital industry which affect both the labor and non-labor portions of the market basket. In addition, there are legislative changes which can affect the PPS update factor. Also, utilization of hospital services are often affected in unpredictable ways.

On the basis of the unpredictability of HI outlays, one could argue that an appropriate level of the HI trust fund should be at least the same as for the OASDI trust fund as a percent of the following years outgo. The HI trust fund does not have the same beginning of the month requirement as the OASDI trust funds, since HI outlays are spread out over the month. But neither does the HI trust fund have the advantage of estimated revenues being deposited at the beginning of the month. As experience has shown, there is much more volatility in HI outlays than in OASDI outlays. Hence, considering all economic and non-economic conditions together, a trust fund ratio of at least 100 percent is not unreasonable for HI.

In order to quantify our impressions, we created the following scenario. Suppose the financing for the HI program was established on the basis of an intermediate set of assumptions, say alternative II-B of the 1990 Trustees Report. Then suppose the future experience of the program was that which resulted from a pessimistic set of assumptions, say alternative III. We can then create a trust fund runout, which would show how long it would take for the trust fund to be exhausted. The attached table I was done under this scenario. We see that the trust fund is exhausted in 11 years. We can also see that when the fund is at about 100 percent, it takes 8 years to be exhausted. When it is about 50 percent, it takes 4 years and when it is around 25 percent, it takes about 2 years.

The results in the table I are not too different than alternative III in the 1990 Trustees Report (attached table II) in terms of number of years before exhaustion of the trust fund. The major difference is that alternative III assumes the level tax rate in current law. This scenario assumes an increasing tax rate that one would get if the program was financed on a true pay-as-you-go basis. We chose to do it this way because with a level tax rate, even when established using intermediate assumptions, the trust fund ratio increases for a few years under adverse conditions. The fact that the alternative III projections and this scenario are similar is a reflection of the critical condition of the financing for the HI program.

Based on the scenario created here, if the trust fund had assets equal to at least one years outlays and then experienced adverse conditions, the fund would be exhausted between 5 and 10 years. This should be sufficient time for Congress to correct the financing of the HI program. It would be prudent to recommend more time (5 to 10 years) for Congress to react to a financial crisis rather than less time (less than 5 years). Given enough time Congress can study the situation thoughtfully and make modifications to the program to correct the financial imbalance. These modifications could include benefit cuts, benefit restructuring, tax increases, or a combination of these. With little time to react, Congress is likely to try to solve the situation by precipitous tax increases which may only delay the financial problems of the program for a few years.

Another consideration when deciding on an appropriate level of the trust fund is whether or not the assumptions used in the projections are conservative. Higher trust fund ratios would be required when the assumptions, as in the 1990 Trustees Report, are not at all conservative.

The scenario we created was only one example of adverse conditions. There could be other scenarios which could exhaust the fund even faster. For example, under alternative III in the 1990 Trustees Report, the trust fund ratio goes from 120 percent to exhaustion in 5 years. Congress tends to move slowly in correcting the financing of social insurance programs. If we want Congress to have sufficient time to react (between 5 and 10 years) and to allow for the possibility of conditions worse than alternative III, a recommendation of at least 125 percent is justifiable.

Sol Mussey

Sol Mussey
Director, OMMCE, OAct

TABLE I

TRUST FUND OPERATIONS UNDER ALTERNATIVE SCENARIO

YEAR	TAX REVENUES 1/	OUTGO	TF BALANCE 2/	TF RATIO 3/
<hr/>				
1990	\$62.0	\$63.8	\$91.7	134%
1991	67.6	70.8	96.3	130
1992	75.7	79.6	99.9	121
1993	84.1	89.5	101.6	112
1994	91.0	99.6	99.6	102
1995	102.3	112.4	95.5	89
1996	113.2	126.4	87.7	76
1997	124.7	141.7	75.1	62
1998	137.3	158.6	57.2	47
1999	151.1	177.2	33.3	32
2000	165.8	196.8	3.1	17
2001	180.7	217.7	4/	1

1/ TAX REVENUES ONLY. INTEREST INCOME IS IN TF BALANCE

2/ TRUST FUND BALANCE AT END OF YEAR

3/ TRUST FUND BALANCE AT END OF PRIOR YEAR DIVIDED BY OUTGO
FOR THE YEAR (AS A PERCENT)

4/ TRUST FUND IS EXHAUSTED IN 2001

OFFICE OF THE ACTUARY
NOVEMBER 9, 1990

TABLE II

TRUST FUND OPERATIONS UNDER ALTERNATIVE III

YEAR	INCOME 1/	OUTGO	TF BALANCE 2/	TF RATIO 3/
1990	\$79.8	\$63.7	\$101.7	134%
1991	83.4	70.0	115.0	145
1992	89.0	78.6	125.4	146
1993	95.0	88.5	131.9	142
1994	98.8	98.3	132.4	134
1995	104.6	110.7	126.3	120
1996	110.2	124.6	112.0	101
1997	115.0	139.7	87.2	80
1998	119.2	156.4	50.1	56
1999	122.6	174.8	4/	29

1/ TOTAL INCOME INCLUDING INTEREST INCOME

2/ TRUST FUND BALANCE AT END OF YEAR

3/ TRUST FUND BALANCE AT END OF PRIOR YEAR DIVIDED BY OUTGO
FOR THE YEAR (AS A PERCENT)

4/ TRUST FUND IS EXHAUSTED IN 1999

OFFICE OF THE ACTUARY
NOVEMBER 9, 1990

APPENDIX D

Supplementary Medical Insurance (SMI) Contingency Reserves



DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care
Financing Administration

Memorandum

Date November 30, 1990
From Sol Mussey
Office of the Actuary
Subject SMI Contingency Reserves
To Health Technical Panel

SMI contingency reserves are usually looked at in terms of the ratio of assets less liabilities at the end of the year to the following years incurred outlays. Liabilities at the end of a year is defined as the incurred but unpaid claims. When deciding on the appropriate percentage for assets less liabilities, we look at the ratio of assets less liabilities to the following year's incurred expenses at the time of each year's premium promulgation to the ratio at the time of the most recent premium promulgation. The attached paper shows our most recent analysis. Based on this analysis our current estimate for optimal margin is 6 percent. The analysis shows that the average overestimate for all prior years is 5.6 percent which we rounded to 6 percent.

Another simplified way of looking at the question of optimal contingency reserve is to compare the yearly increases in reimbursement per capita to a long term average increase in reimbursement per capita. This was done in attachment II for the years 1967 to 1988. The average increase over these years was about 14.3 percent. The largest increase was 28.1 percent or 13.8 percent higher than the average. Since the largest increase was for 1968, the second year of the program, we also did this analysis leaving out 1967 and 1968. Without the first two years, we then see the largest increase is in 1983. This increase is 6.8 percent higher than the average for 1969 to 1988. One could then conclude that a contingency margin should be able to withstand an underestimate of the increase in reimbursement per capita of up to 7 percent.

The analysis done in attachment I is more sophisticated than that done in attachment II. Attachment I looks at the difference in the actual assets less liabilities and the amount projected at the time of the original premium promulgation. Hence, we are making a comparison of actual results with our best estimates at the time of each premium promulgation. Attachment II makes a comparison against a long-term trend rather than a best estimate.

Sol Mussey
Sol Mussey
Director, OMMCE, OAct

ATTACHMENT I

ANALYSIS OF THE RATIO OF ASSETS-LESS-LIABILITIES TO THE FOLLOWING YEAR'S INCURRED EXPENSES

The ratio of assets-less-liabilities to the following year's incurred expenses at the time of the premium promulgation was compared to the ratio of assets-less-liabilities at the time of 1988 premium promulgation to the same incurred expenses. The differences in the ratios were analyzed in order to determine a "good" margin to cover projection errors of this sort.

My analysis treated the old-fiscal-year ratios from 1976-1983 and the calendar-year ratios from 1984-1987. The ratio that uses the assets-less-liabilities at the time of the 1988 premium promulgation is considered as the "actual" ratio. The "actual" ratios minus the time-of-promulgation ratios are listed on the next page.

Some years the benefits were overestimated and sometimes underestimated. We have a tendency to overestimate the benefits. Sixty-seven percent of the time we overestimate and 33% of the time we underestimate. Note that underestimation is dangerous to the fiscal integrity of the program but overestimation is not. Because of our tendency to overestimate, my recommendation is that the margin that should be used to cover the projection error be 6.0%. This is about the average difference between the actual and time-of-promulgation ratios when we underestimate the benefits. Depending on the estimation of benefit error, the difference between the actual and time-of-promulgation ratio goes up or down. For example, if we underestimate the benefits, the difference between the actual and the time-of-promulgation ratios will be negative (refer to the next page).

Chris Molling
Office of the Actuary

ASSETS LESS LIABILITIES

	-----Old FY-----										-----CY-----	
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
=====												
<AS OF>												
-1												
Year of Promulgation	277	-343	112	1212	1737	1723	1022	1552	1726	2728	5799	-737
+1	-599	-110	1006	2217	1888	-18	1042	222*	3673	7850	5055	-1494
+2	-424	311	1587	2291	1272	-164	1650	2808	6608	7687	3185	
+3	-246	495	1535	2073	1179	331	2165	4288	6568	6699		
+4	-176	446	1452	2022	1423	329	2985	4348	5719			
+5	-208	417	1391	2208	1466	942	3014	3831				
+6	-202	337	1596	2257	1838	948	2746					
+7	-245	532	1601	2498	1842	816						
+8	-39	536	1782	2500	1782							
+9	-45	636	1783	2493								
+10	4	637	1778									
+11	5	633										
+12	1											
Actual net surplus of year 2	1	633	1778	2493	1782	816	2746	3831	5719	6699	3185	-1494

	-----Old FY-----										-----CY-----	
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
=====												
Actual net surplus of year 2	1	633	1778	2493	1782	816	2746	3831	5719	6699	3185	-1494
Incurred Benefits of Z+1	4995	6907	8804	9968	11033	13325	17890	20253	25392	28269	28964	33598
Incurred Admin of Z+1	535	600	624	677	771	688	792	887	896	962	994	1147
Ratio at Promulgation	5.0%	-4.6%	1.2%	11.4%	16.7%	12.3%	5.5%	7.3%	6.6%	9.3%	19.4%	-2.1%
Ratio using actuals	0.0%	8.4%	18.9%	23.4%	15.1%	5.8%	14.7%	18.1%	21.8%	22.9%	10.6%	-4.3%
Absolute value of difference	5.0%	13.0%	17.7%	12.0%	0.4%	6.5%	9.2%	10.8%	15.2%	13.6%	8.7%	2.2%
Difference of actuals-promulg	-5.0%	13.0%	17.7%	12.0%	0.4%	-6.5%	9.2%	10.8%	15.2%	13.6%	-8.7%	-2.2%

From the years 1976-1987

Worst underestimate	17.7%											
Worst overestimate	-8.7%											
Average underestimate	11.5%											
Average overestimate	-5.6%						2.3%					
Average absolute difference	9.5%						5.0%					

Attachment II

COMPARISON OF YEARLY INCREASE IN REIMBURSEMENT PER CAPITA WITH AVERAGE INCREASE FROM 1967 TO 1988

YEAR	REIMB	INCR	CHANGE 1	CHANGE 2	
1967	862.51				WITH 1967 & 1968
1968	80.06	1.2808	0.1381		-----
1969	93.74	1.1709	0.0282		AVERAGE INCREASE = 1.1426
1970	99.91	1.0658	-0.0768	-0.0685	MAXIMUM PLUS = 0.1381
1971	106.25	1.0635	-0.0792	-0.0709	MAXIMUM MINUS = -0.0792
1972	114.22	1.0750	-0.0676	-0.0593	
1973	122.39	1.0715	-0.0711	-0.0628	STANDARD DEV. = 0.0535
1974	134.38	1.0980	-0.0447	-0.0364	
1975	160.26	1.1926	0.0500	0.0583	
1976	188.60	1.1768	0.0342	0.0425	
1977	221.38	1.1738	0.0312	0.0395	WITHOUT 1967 & 1968
1978	254.19	1.1482	0.0056	0.0139	-----
1979	289.55	1.1391	-0.0035	0.0048	AVERAGE INCREASE = 1.1343
1980	343.02	1.1847	0.0420	0.0503	
1981	407.45	1.1878	0.0452	0.0535	MAXIMUM PLUS = 0.0682
1982	465.33	1.1421	-0.0006	0.0077	MAXIMUM MINUS = -0.0709
1983	559.57	1.2025	0.0599	0.0682	
1984	617.34	1.1390	-0.0036	0.0047	STANDARD DEV. = 0.0455
1985	687.11	1.0781	-0.0645	-0.0562	
1986	785.11	1.1426	0.0000	0.0083	
1987	907.43	1.1558	0.0132	0.0215	
1988	1027.89	1.1327	-0.0099	-0.0016	

NOVEMBER 26, 1990

APPENDIX E1

Measures of Actuarial Balance

Historical background in excerpt from:

"Social Security Financing in North America," by
Harry Ballantyne, Chief Actuary for Social Security,
Social Security Bulletin, April 1989, pp. 7-8.

The law requires that annual reports be made to Congress showing the actuarial status of both the OASDI and HI programs. Estimates of trust fund operations over the next 5 years are made to measure the adequacy of projected trust fund levels relative to annual outgo. To measure the adequacy of scheduled tax rates, long-range cost estimates are also made for each of the next 75 years. For direct comparison with estimated income rates, these estimates are expressed as "cost rates," representing the cost of the program as a percentage of future taxable payroll. The estimated income rate for a year is the sum of (1) the scheduled tax rate for the year and (2) the estimated income from the taxation of Social Security benefits, expressed as a percentage of taxable earnings, in the year.

The difference between the income rate and the cost rate, for a year, is the annual balance. The long-range financial status of the trust funds is summarized by the calculation of the actuarial balance over the 75-year projection period. In connection with the actuarial balance, a summarized income rate and a summarized cost rate are also calculated.

The actuarial balance of the OASDI program is the difference between the estimated summarized income rate and the estimated summarized cost rate over the 75-year projection period. If the actuarial balance is positive, the

program is said to have an actuarial surplus; if it is negative, an actuarial deficit occurs. The existence of a deficit indicates that, unless the projected trends turn out to be too pessimistic, changes in the system will be needed to make it viable in the future.

During the period 1972-87, the summarized income and cost rates were simply the averages of the estimated annual rates over the 75-year projection periods. (Before 1984, the annual income rates were the same as the annual tax rates because benefits were not yet taxable.) Until 1972, the summarized rates were based on present-value calculations. (The "present value" of a future sum of money is the amount that, if it were invested on the date for which the present-value calculation is made, would accumulate with interest to equal the future sum of money.) Calculations were made of the present value of future tax income, future expenditures, and future taxable payrolls. For example, the summarized cost rate over the 75-year projection period was the present value, at the beginning of the period, of estimated expenditures during the period, expressed as a percentage of the present value of estimated taxable earnings during the projection period. In calculating the actuarial balance based on the present-value calculations, the fund balance at the beginning of the projection period was also taken into account. This accounting involved adding the beginning fund balance, as a percentage of the present value of the taxable payroll, to the summarized income rate, before subtracting the summarized cost rate.

Beginning in 1972, the summarized rates were changed to averages, rather than present

values, because both methods produced similar results, and the averaging method is simpler. The results were similar for two reasons. First, under the current-cost financing basis then in effect, the incidence of the estimated tax income and the incidence of the estimated expenditures were about the same over the projection period (that is, they were about equal in each year over the 75-year projection period), so that their present values were about the same. Second, the estimated annual rate of increase in taxable payroll over the projection period was about equal to the assumed rate of interest earned by the trust funds during the projection period. (It can be shown, mathematically, that the averaging calculation produces the same result as the present-value calculation, regardless of the relative incidences of tax income and expenditures, if the interest rate used in the present-value calculation is equal to the estimated rate of increase in taxable payroll.) In calculating the actuarial balance from the average rates, the beginning fund balance was not taken into account.

Since 1973, several occurrences have gradually caused the average rates and the present value rates to diverge. First, changes in the long-range assumptions, such as reductions in assumed ultimate fertility rates and real wage gains, have resulted in lower estimated rates of increase in taxable payroll. As a result, the assumed long-range interest rate, which has not been reduced, is now higher than the estimated rate of increase in taxable payroll. Second, as previously indicated, the 1977 and 1983 amendments changed the annual incidence of income and outgo from "pay-as-you-go" to partial advance funding, with higher income, relative to outgo, in the

earlier years of the projection period, and lower income, relative to outgo, in the later years. Both of these phenomena cause the average actuarial balance to be lower, over the next 75 years, than the actuarial balance based on present values. In recognition of this situation, the latest actuarial estimates are based on the present-value calculations. These estimates are shown in the 1988 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds.

For comparison with the present-value calculations, the report also shows the average income and cost rates, and the average actuarial balance. In the report, the term "level-financing basis" refers to the present-value calculations. The report defines the level-financing calculations as rates based on the present values of the future tax income, outgo, and taxable payroll. The level-financing income rate is shown with the inclusion of the fund balance, at the beginning of the projection period, as a percentage of the present value of the taxable payroll. The average income rate and the average actuarial balance do not include the effect of the beginning fund balance. Thus, as the trust funds accumulate, the level-financing actuarial balance will, in the future, change less rapidly than the average balance.

The standard for determining "close actuarial balance" has remained unchanged since 1972. Based on this standard, the OASDI program is said to be in close actuarial balance if the summarized income rate, over the 75-year projection period is between 95 percent and 105 percent of the summarized cost rate, based on intermediate economic and demographic assumptions.

APPENDIX E2

Measures of Actuarial Balance

**"Proposed Change in Method of
Measuring Actuarial Balance for HI," by
Roland E. (Guy) King, Chief Actuary
Health Care Financing Administration
December 1988**

Proposed Changes in Method of Measuring Actuarial Balance for HI

By: Roland E. (Guy) King, F.S.A.

Chief Actuary

Health Care Financing Administration

In the 1988 OASDI Trustees' Report, the method of measuring the actuarial balance of the OASI program was changed from the average cost method to the level financing method. Now the trustees have made known their intention to adopt the level financing method for the HI program.

I maintain that the level financing method is a technically inappropriate and misleading measure of actuarial balance unless the trustees clearly report that under this method they have assumed that any deficit in financing will be advance funded. By adopting the level financing method for the OASI program, the Trustees have done more than recognize the interest that will actually be earned on the projected trust funds under current law. They have implicitly assumed that significant amounts of interest will be earned on the trust funds over and above the interest amounts that will be earned under current law projections. In other words, by assuming that a substantial portion of the deficit will be eliminated by additional interest accumulations rather than by additional taxes or outlay reductions, they have either significantly understated the deficit in the OASI program or have, in effect, endorsed advance funding of the deficit.

The amount of the additional interest that is assumed under the level financing method can be determined by examining the attached OASI trust fund run-out. Under the Alternative II-B assumptions, the total OASI deficit, accumulated with interest, is \$51.6 trillion at the end of the 75-year projection period, so the amount of money needed to eliminate the deficit and place the OASI program in actuarial balance is \$51.6 trillion (assuming a fund balance of \$0 at the end of the 75-year projection period is acceptable). Under Alternative II-B, the OASI level financing actuarial balance is -.45 percent of taxable payroll. Applying this figure to the OASI taxable payroll for each year and summing over the 75-year projection period produces the "principal" part of the contribution to the deficit which is \$10.3 trillion. Subtracting this from the \$51.6 trillion deficit indicates that the remainder of \$41.3 trillion must be made up by interest earnings. The negative interest costs that will be avoided by eliminating the deficit can also be summed directly from the OASI trust fund run-out, and amount to \$15.2 trillion. Subtracting this from the total interest of \$41.3 trillion yields \$26.1 trillion. This is the amount of interest the Trustees have implicitly assumed will be earned, over and above that interest already earned under current law. To place the magnitude of this assumed interest in perspective, the total amount of net interest which the OASI fund will earn during the 75-year projection period is only \$7.3 trillion (composed of \$22.5 trillion in positive interest before the year of depletion and \$15.2 trillion in negative interest in the year of depletion and later). Thus, the amount of interest that the Trustees have implicitly assumed is greater than the interest amount that the

OASI fund will actually earn under current law projections. In order to earn \$26.1 trillion in interest, the \$10.3 trillion in "principal" payments must be left to accumulate in the trust fund for an average of over 21 years.

It will be demonstrated that this result coincides with the interest amount derived directly from the identity which defines the actuarial balance, indicating that advance funding is, indeed, an implicit assumption of the level financing method. The interest amount implicit in the identity which defines the actuarial balance can be derived as follows:

Define:

- AB = Actuarial balance (average cost method)
- AB' = Actuarial balance (level financing method)
- C_t = total program costs in year t
- TR = tax rate (assumed constant here)
- TP_t = taxable payroll in year t
- R_t = non-interest revenue in year t
- so R_t = TR · TP
- TF_t = trust fund balance at beginning of year t
- i = interest rate (assumed constant here)
- v = 1/(1 + i) (discount factor)

For the sake of simplicity, it is assumed that the tax rate is constant, that interest rates are constant, and that all income and outgo occur on the first day of the year.

The actuarial balance under the average cost method is computed as follows:

$$(1) \quad AB = \frac{1}{75} \left[\sum_{t=1}^{75} \left(TR - \frac{C_t}{TP_t} \right) \right]$$

The actuarial balance under the level financing method is computed as follows:

$$(2) \quad AB' = \frac{TF_1 + \sum_{t=1}^{75} v^{t-1} (R_t - C_t)}{\sum_{t=1}^{75} v^{t-1} TP_t}$$

Multiplying both numerator and denominator of the right side of equation (2) by (1 + i)⁷⁵, we obtain

$$AB' = \frac{TF_1 (1+i)^{75} + \sum_{t=1}^{75} (1+i)^{76-t} (R_t - C_t)}{\sum_{t=1}^{75} (1+i)^{76-t} TP_t}$$

The interest component of each accumulation factor can be separated from the principle component by noting that $(1+i)^{76-t}-1$ is the interest component and 1 is the principle component.

$$AB' \left\{ \sum_{t=1}^{75} \left[(1+i)^{76-t} - 1 \right] TP_t + TP_t \right\} = TF_1 \left[(1+i)^{75} - 1 \right] + TF_1 \\ + \sum_{t=1}^{75} \left[(1+i)^{76-t} - 1 \right] (R_t - C_t) + \sum_{t=1}^{75} (R_t - C_t)$$

Gathering all of the interest terms on the same side of the equation yields:

$$\text{total interest} = AB' \sum_{t=1}^{75} TP_t - \sum_{t=1}^{75} R_t + \sum_{t=1}^{75} C_t - TF_1$$

The following values have been derived from the OASI tables attached:

$$\sum_{t=1}^{75} C_t = \$324,659 \text{ billion}$$

$$\sum_{t=1}^{75} R_t = \$265,735 \text{ billion}$$

$$AB' \cdot \sum_{t=1}^{75} TP_t = -\$10,289 \text{ billion}$$

$$TF_1 = \$62 \text{ billion}$$

Substituting these values into the equation above yields total interest earnings of \$48,573 billion or \$48.6 trillion. Once again, this amount exceeds the \$22.5 trillion in interest which the OASI trust fund earns under current law by \$26.1 trillion.

The fact that the \$26.1 trillion in assumed interest derived directly from the identity for the level financing method is equal to the amount of interest derived by assuming advanced funding of the deficit makes it apparent that the assumed interest constitutes an implicit assumption of the method. Ironically, the Trustees have commissioned studies demonstrating that the advance funding of the OASI program would, in the long run, have adverse affects on the financing of the program. Now they have endorsed the level financing method for the HI program while at the same time expressing their opposition to advance funding in the HI program.

Since the level financing method clearly presents a misleading measure of the actuarial balance of any social insurance program which is not advance funded, the question arises regarding the appropriate measure to use which does reflect interest actually earned on the fund but does not assume that additional interest will be earned.

The formula below presents a generalized version of the method used to compute the actuarial balance for the HI program. This method of measuring the actuarial balance is the same method that was used for the HI program before 1988. Ironically, in 1988, at the same time they changed the OASI methodology to reflect interest earnings, the Trustees changed the HI methodology to ignore interest earnings. Using the same assumptions and notation as above, define, in addition:

The target trust fund at beginning of year t is defined as: TTF_t

The cost of trust fund building and maintenance is defined as:

$$M_t = \frac{TTF_{t+1} - TTF_t(1+i)}{(1+i)}$$

define:

$$AB_t = TR - \frac{C_t + M_t}{TP_t}$$

so that

$$(3) \quad AB'' = \frac{1}{75} \frac{75}{C=1} AB_t$$

This method has several desirable features: (1) It recognizes interest, (2) It recognizes the beginning trust fund balance, (3) It incorporates a target fund.

The target trust fund balance can be set at any desired level, so that any desired pattern of funding can be achieved by specifying the level of the target trust fund.

In developing the actuarial balance for the HI program with a minimum reserve ratio of 50 percent, we set $TTF_t = TF_t$ whenever the trust fund exceeded 50 percent of the outlays, and $TTF_t = .5 C_t$ whenever $TF_t \leq .5 C_t$. However, it is possible to set the target trust fund, TTF_t , at any desired level. For example, if it were desirable to maintain a trust fund ratio of 100 percent of outlays throughout the projection period, TTF_t would be defined as follows:

$$TTF_1 = TF_1$$

$$TTF_t = C_t \text{ for } 1 \leq t \leq 75$$

A desirable feature of any method for determining the actuarial balance is that it not incorporate the assumption of interest earnings (over and above interest earned under current law) unless a higher level of funding which produces those interest earnings is specifically intended by the Congress or specifically recommended by the Board of Trustees. With a specified minimum target trust fund of zero, the method above recognizes precisely the same amount of interest which the trust fund earns under current law. This fact can be demonstrated as follows:

If d is the year of depletion of the trust fund, then the target trust fund balances are specified as follows:

$$TTF_t = TF_t \quad 1 \leq t \leq d$$

$$TTF_t = 0 \quad d+1 \leq t \leq 75$$

Starting from the definition of AB_t and M_t :

$$AB_t \cdot TP_t = TR \cdot TP_t - C_t + TTF_t - v(1+i) TTF_{t+1} + v i TTF_{t+1}$$

$$\sum_{t=1}^{75} (AB_t \cdot TP_t - TR \cdot TP_t + C_t - TTF_t + TTF_{t+1}) = \sum_{t=d+1}^{75} v i TTF_{t+1}$$

but $\sum_{t=d+1}^{75} v i TTF_{t+1}$ is the total interest assumed to be earned under this method. This amount of interest can be designated I_m , so that (noting that $TF_t = TTF_t$ for $t \leq d$) the equation above can be rewritten as follows:

$$I_m = \sum_{t=1}^{75} v i TTF_{t+1} = \sum_{t=1}^d (AB_t \cdot TP_t - TR \cdot TP_t + C_t - TF_t + TF_{t+1}) + \sum_{t=d+1}^{75} (AB_t \cdot TP_t - TR \cdot TP_t + C_t - TTF_t + TTF_{t+1})$$

Noting that $AB_t = 0$ for $t \leq d$, the equation above can be rewritten as follows:

$$I_m = \sum_{t=1}^d \left[\Delta TF_t - (TR \cdot TP_t - C_t) \right] + \sum_{t=d+1}^{75} \left[\Delta TTF_t - (TR - AB_t) TP_t + C_t \right]$$

But the first term above is equal to the total amount of interest earned under current law, and the second term can be shown to be zero by noting that $M_t = 0$ for $t > d$ so that $AB_t = TR - C_t/TP_t$ for $t > d$. Thus, the interest assumed under this method (using the funding level specified) is precisely the same as the interest earned by the trust fund under current law projections.

This method allows considerable flexibility in computing the actuarial balance based upon the level of advance funding specified. For example, if it were desired to provide the same level of advance funding as implied by the level financing method, the actuarial balance produced is precisely the same as the actuarial balance produced by the level financing method. This can be demonstrated as follows:

Suppose we produced a hypothetical trust fund projection by changing the tax rate each year by the opposite of the level financing actuarial balance, AB' , so that we develop target trust funds recursively from the formula

$$(4) \quad TTF_t = \left[TTF_{t-1} - C_{t-1} + (TR - AB') TP_{t-1} \right] (1+i) \text{ with } TTF_1 = TF_1$$

Based upon the equation for the actuarial balance, for year $t-1$

$$AB_{t-1} \cdot TP_{t-1} = TR \cdot TP_{t-1} - C_{t-1} - v TTF_t + TTF_{t-1}$$

rearranging:

$$TTF_t = \left[TTF_{t-1} - C_{t-1} + (TR - AB_{t-1}) TP_{t-1} \right] (1+i)$$

A comparison of this equation with equation (1) above indicates that $AB_t = AB'$ for all values of t , therefore $AB'' = AB'$ when we specify a funding level identical to the funding level implicit in the level financing method.

The demonstrations above illustrate, in part, three powerful advantages which the method discussed here has over the level financing method.

First, this method doesn't assume interest earnings (over and above that earned under current law) unless a level of advance funding of the actuarial deficit is specified which will result in additional interest earnings. The level financing method implicitly assumes that advance funding of the actuarial deficit will result in significant interest earnings over and above those earned under current law.

Second, this method has the flexibility to adapt to any specified pattern of funding and the funding pattern must be described explicitly. The level financing method can't be adapted to specific funding patterns and the assumption of advanced funding is implicit in the method.

Third, this method produces, as a by-product of the computation of the actuarial balance, the precise timing and level of change in the tax rates necessary to maintain a given funding level. For example, if a 100 percent trust fund ratio were

specified, the AB_t's which were used in computing the actuarial balance (with a 100 percent trust fund ratio specified) would define the precise adjustment to the tax schedule necessary to maintain a 100 percent trust fund ratio.

Because the method of equation (3) appropriately reflects actual interest earnings on the fund without inappropriately assuming additional interest earnings and because of the advantages described above, I consider it to be the most appropriate method for measuring the actuarial balance of the HI program.

Attachment

Year	Advance Transfr	Assets (Bv)	LFM	Payroll (aasUaU)	Payroll (aasUaU)	Interest	Viail (s)	TOTAL INCOME	Benefit Payments(018)	Admin	Intchp	BAG	TOTAL OUTGO	Assets (Bv)
1988	19784	81933	41	229165	3347	1406	9.743	239960	195419	1704	2842	199965	102144	102144
1989	21500	123694	58	247363	3796	11091	9.516	257784	17045	1704	2962	212187	147421	147421
1990	23183	170424	75	260713	4429	15420	9.434	280589	223212	1853	3066	227231	200600	200600
1991	24612	225212	93	277454	4927	20174	9.263	302576	236961	1938	3226	242126	261052	261052
1992	287238	287238	112	296011	5398	25214	9.000	326640	251616	2029	3401	257047	330846	330846
1993	358232	358232	132	315693	5847	30485	8.657	352042	266429	2123	3562	272113	410575	410575
1994	440242	440242	153	336493	6119	36016	8.285	378588	281178	2218	3702	287839	501534	501534
1995	533320	533320	176	357909	6515	41891	7.929	406322	297605	2317	3926	303848	603997	603997
1996	33825	337823	199	361058	6833	46256	7.611	436249	314237	2419	4093	320749	719497	719497
1997	35991	753408	223	405090	7378	55163	7.329	467636	331817	2525	4298	338641	848492	848492
1998	38186	888878	248	428798	8542	62671	7.079	501012	350757	2653	4670	356980	992524	992524
1999	40534	103308	275	458219	9769	70573	6.829	536562	369594	2790	5041	376226	1152860	1152860
2000	42709	1195069	301	475071	11069	78059	6.579	564849	390076	2931	5613	396621	1370888	1370888
2001	44759	1365647	327	503775	12445	86431	6.330	602850	411485	3079	5895	417940	1505589	1505589
2002	47463	1553027	353	534211	13898	94523	6.080	642632	434120	3235	6156	440511	1707710	1707710
2003	50345	1758055	378	566650	15453	107895	5.800	689198	458743	3401	6153	464798	1932112	1932112
2004	53395	1985057	404	600977	17112	121027	5.600	739116	484134	3580	6141	490856	2180372	2180372
2005	56615	2238988	431	637275	18898	136403	5.400	792526	512700	3776	6123	519098	2453800	2453800
2006	59900	2513290	457	675208	20819	152396	5.200	849323	542483	3980	6095	549558	2753564	2753564
2007	62701	2817071	484	715208	22893	171760	5.000	909343	575334	4202	6063	582596	3080401	3080401
2008	67205	3147805	508	758488	25717	191749	4.792	979274	612098	4452	6025	619578	3433749	3433749
2009	71107	3504855	529	800371	28781	213149	4.600	1040457	654322	4743	5984	662049	3812151	3812151
2010	75211	3893368	547	848570	29113	238311	4.400	1111944	702358	5056	5937	710354	4213747	4213747
2011	79481	4293228	562	894584	31689	260579	4.200	1186851	755570	5400	5886	763657	4636741	4636741
2012	83923	4721664	574	944515	34554	286611	4.000	1265129	814407	5769	5834	823010	5078861	5078861
2013	88688	5167549	582	998215	37664	317063	3.800	1348442	879588	6172	5781	888941	5538762	5538762
2014	93563	5632325	586	1051800	41141	370797	3.600	1434213	915382	6613	5724	961279	6011716	6011716
2015	98674	6110410	587	1110610	44119	418317	3.400	1513636	1031410	7085	5664	1041111	6414213	6414213
2016	104012	6598725	585	1171687	49162	495462	3.200	1615611	1118547	7600	5502	1128792	6941832	6941832
2017	109591	7091423	579	1233484	53736	475210	3.000	1717231	1213561	8147	5234	1224242	74700271	74700271
2018	115459	7585479	572	1299574	58665	453763	2.800	1819451	1315559	8735	4467	1327161	7954810	7954810
2019	121611	8076447	562	1365800	64009	441968	2.600	1914848	1426724	9357	4397	1437977	8431812	8431812
2020	128174	86594316	550	1442070	69711	518581	2.400	2021371	1546023	10018	4219	1556360	8896822	8896822
2021	134947	9031769	537	1518271	75735	536379	2.200	2130868	1658178	10689	4099	1681114	9346694	9346694
2022	142151	9488809	524	1599554	82061	568205	2.000	2243820	1798086	1116	3748	1811570	9776694	9776694
2023	149660	9978604	509	1684472	88781	588623	1.800	2360105	1935485	12170	3051	1935705	10169343	10169343
2024	157617	10439560	494	1774030	95388	610700	1.600	2493584	2080911	12955	2782	2058214	10572518	10572518
2025	166020	10739538	477	1868605	103074	631606	1.400	2603588	2234141	13781	2619	2170214	10935721	10935721

SHORT-RANGE ACCOUNTS NOT SHOWN SEPARATELY-
Total Income includes Prouty reimbursements:
Total of Benef includes M/S reimbursement:

Date: 04-19-88

Catalog #0034 Table 3.4

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Year	Advance Transfr	Assets (BOV)	CFR	Payroll Taxes0400	Int. Ben	Interest	Yield (%)	TOTAL Personal-0100	INCOME RATE	COST RATE	BALANCE	OASI	FIND	Assets (EOV)
2026	174007	11102237	461	1968406	111233	651251	6.00	2730891	2394168	14619	1715	2410501	11247739	
2027	184246	11431985	443	2073744	119513	668761	6.00	2682018	2563017	15510	1507	2500104	11259643	
2028	194179	11723072	425	2185545	126207	683076	6.00	2997610	2741771	16424	1450	2759645	1157658	
2029	204700	11972356	406	2303966	137421	696232	6.00	3137618	2826961	17358	1308	2945825	11705849	
2030	215405	12175454	388	2428951	146875	705853	6.00	3281658	3119033	18319	1156	3138507	12102600	
2031	227535	12330335	369	2560903	158742	712425	6.00	3430150	3319400	19319	999	3339377	12193232	
2032	239964	12480136	350	2700871	167063	715798	6.00	3563731	3528252	20347	844	3549444	12225039	
2033	253105	12630624	337	2848772	177685	719637	6.00	3742274	3742685	21385	605	3745444	12250509	
2034	266919	12771956	313	3004254	188493	712526	6.00	3905273	3961609	22478	517	3904555	12125757	
2035	281438	12907195	295	3187678	199573	705853	6.00	4073103	4105666	23478	342	4074807	11989373	
2036	294687	12766055	277	3339252	211039	695744	6.00	4246034	4416885	24559	181	4441806	11793802	
2037	311826	12108938	258	3530252	222969	682054	6.00	4452982	4657795	25671	-26	4663440	11536344	
2038	329850	11965195	240	3712560	232980	667600	6.00	4612605	4909434	26766	-221	4936042	11212908	
2039	347812	11560720	227	3914739	246508	643050	6.00	4760293	5172688	28023	-425	5200487	10918714	
2040	366880	11185394	204	4127094	262051	617276	6.00	5068371	5446610	29255	-630	5479526	10349559	
2041	388483	10736041	188	4349994	276255	586787	6.00	5213005	5733814	30548	-681	5763499	9789065	
2042	407365	10206479	168	4595017	291270	551247	6.00	5427533	6034592	31895	-1092	6081495	9159103	
2043	429332	9588435	150	4832266	307170	510084	6.00	5649521	6359318	33378	-1335	6390311	8418313	
2044	452451	8870764	137	5092745	324059	482597	6.00	5879121	6599579	34614	-1506	6732805	7584629	
2045	478777	8041408	113	5386275	341914	448009	6.00	6116198	7061431	36382	-1853	7095961	6584866	
2046	502394	7087280	95	5654599	360999	345454	6.00	6361052	7447889	38030	-2128	7483782	5482127	
2047	529373	5991500	78	5958258	381407	273864	6.00	6613524	7860724	39773	-2414	7890893	4171568	
2048	557790	4735358	57	6276098	403145	192054	6.00	6873298	8301992	41806	-2711	8348086	2709978	
2049	587143	3297721	37	6615278	428422	98755	6.00	7140404	8772306	43542	-3021	8812827	1037556	
2050	619777	1656833	18	6970157	451145	-1398	6.00	7413904	9773284	45574	-3346	9315512	-664051	
2051	652502	-211549	-2	7344118	477348	-127876	6.00	7693359	9805836	47710	-3686	9849660	-3020321	
2052	685937	-733148	-22	7739124	505191	-264135	6.00	7980180	10169281	49934	-4043	10451171	-5451112	
2053	724678	-4136453	-63	8156453	534472	-417601	6.00	8273325	10863527	52524	-4420	11013361	-8193149	
2054	761806	-7429543	-63	8586817	564467	-588486	6.00	8672506	11597180	54682	-4821	11642040	-11262084	
2055	805123	-10457762	-85	9061912	598207	-787547	6.00	8877572	12755834	57209	-5243	12307801	-14693113	
2056	848737	-13844375	-106	9552804	632626	-997416	6.00	9188014	12953027	59830	-5690	13007167	-18512266	
2057	894739	-17617527	-128	10070573	668876	-1236330	6.00	9503129	13689645	62598	-6185	13748077	-22755214	
2058	943218	-21811996	-150	10616215	707163	-1507268	6.00	98722083	14464375	65438	-6667	14523145	-27458276	
2059	994373	-26461903	-173	11191983	747092	-1794293	6.00	10476808	15274630	68410	-7198	15336841	-32647535	
2060	1048305	-31599231	-195	11799001	789127	-2117478	6.00	10740895	16127575	71490	-7763	16191302	-38368142	
2061	1105155	-37267988	-218	12438895	833270	-2473002	6.00	10799027	17021650	74702	-8381	17088191	-44857256	
2062	1165095	-43492162	-241	13113509	879594	-2863482	6.00	11129621	17981890	78101	-8984	18003941	-51858576	
2063	1228286	-50330290	-265	13827478	928092	-3351478	6.00	11461362	18948383	81510	-9782	18986180	-59868000	
2064	1294897	-57827545	-288	14574472	979424	-3759900	6.00	11793995	19988238	85155	-10376	20085013	-67384880	
2065	1365076	-66021384	-312	15364363	1033300	-4271967	6.00	12125596	21083459	88937	-11132	21181264	-76427078	

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Year	Payroll	Tea	Loan	Benef	Rate	INCOME	Benefit	Rate	Admin	Exp	Total	OASI	INCOME	COST	RATE	BALANCE	OASI	OPERATIONS
2020	17980391	10.98	111233	82	11.60	2394168	13.31	14819	00	1715	01	2410501	13.40	9.29	2.05	13.40	13.40	13.40
2021	18540905	10.98	119513	83	11.61	2583017	13.53	15510	00	1987	01	2580114	13.62	9.29	2.05	13.62	13.62	13.62
2022	19370800	10.98	120287	84	11.62	2741771	13.73	16424	00	1950	01	2739645	13.82	9.29	2.05	13.82	13.82	13.82
2023	21053175	10.98	137421	85	11.63	2826961	13.90	17558	00	1366	01	2945825	13.99	9.29	2.05	13.99	13.99	13.99
2024	22195307	10.98	146875	86	11.64	3110033	14.05	18319	00	1156	01	3138507	14.14	9.29	2.05	14.14	14.14	14.14
2025	23401801	10.98	158142	87	11.65	3318400	14.18	19319	00	999	00	3339217	14.27	9.29	2.05	14.27	14.27	14.27
2026	24860403	10.98	167063	88	11.66	3528252	14.30	20347	00	844	00	3548444	14.38	9.29	2.05	14.38	14.38	14.38
2027	26032040	10.98	177665	89	11.66	3742685	14.40	21305	00	685	00	3764755	14.46	9.29	2.05	14.46	14.46	14.46
2028	27452835	10.98	188493	90	11.67	3961009	14.43	22426	00	517	00	3984555	14.51	9.29	2.05	14.51	14.51	14.51
2029	28945804	10.98	199573	91	11.67	4185666	14.46	23476	00	342	00	4209487	14.54	9.29	2.05	14.54	14.54	14.54
2030	30513363	10.98	211039	92	11.67	4416885	14.48	24559	00	161	00	4441688	14.58	9.29	2.05	14.58	14.58	14.58
2031	32174008	10.98	222988	93	11.67	4657795	14.48	25671	00	26	00	4683440	14.58	9.29	2.05	14.58	14.58	14.58
2032	33922497	10.98	235406	94	11.67	4909434	14.47	26828	00	721	00	4938042	14.55	9.29	2.05	14.55	14.55	14.55
2033	35772340	10.98	248506	95	11.67	5172868	14.46	28023	00	425	00	5200487	14.54	9.29	2.05	14.54	14.54	14.54
2034	37712814	10.98	262051	96	11.67	5446910	14.44	29255	00	638	00	5475528	14.52	9.29	2.05	14.52	14.52	14.52
2035	39748907	10.98	276255	97	11.67	5732814	14.43	30548	00	881	00	5763499	14.50	9.29	2.05	14.50	14.50	14.50
2036	41898707	10.98	291270	98	11.68	6036892	14.41	31895	00	1043	00	6067495	14.48	9.29	2.05	14.48	14.48	14.48
2037	44155836	10.98	307170	99	11.68	6356318	14.40	33320	00	1335	00	6390311	14.47	9.29	2.05	14.47	14.47	14.47
2038	46533422	10.98	324059	100	11.68	6695779	14.40	34814	07	1586	00	6720005	14.47	9.29	2.05	14.47	14.47	14.47
2039	49035185	10.98	341914	101	11.68	7061431	14.40	36382	07	1853	00	7085981	14.47	9.29	2.05	14.47	14.47	14.47
2040	51689707	10.98	360999	102	11.68	7447089	14.41	38030	07	2128	00	7463792	14.48	9.29	2.05	14.48	14.48	14.48
2041	54444381	10.98	381402	103	11.68	7860724	14.44	39773	07	2414	00	7888083	14.54	9.29	2.05	14.54	14.54	14.54
2042	57366918	10.98	403145	104	11.68	8301992	14.47	41606	07	2711	00	8328086	14.54	9.29	2.05	14.54	14.54	14.54
2043	60447532	10.98	426422	105	11.69	8772306	14.51	43542	07	3021	00	8820822	14.50	9.29	2.05	14.50	14.50	14.50
2044	63690639	10.98	451145	106	11.69	9213284	14.56	45574	07	3346	01	9315512	14.63	9.29	2.05	14.63	14.63	14.63
2045	67107144	10.98	477340	107	11.69	9695838	14.61	47710	07	3686	01	9849860	14.66	9.29	2.05	14.66	14.66	14.66
2046	70717155	10.98	505472	108	11.69	10309261	14.66	49934	07	4043	01	10415171	14.73	9.29	2.05	14.73	14.73	14.73
2047	74531305	10.98	535472	109	11.70	10963577	14.71	52554	07	4420	01	11011361	14.77	9.29	2.05	14.77	14.77	14.77
2048	78559673	10.98	565467	110	11.70	11592160	14.76	54682	07	4821	01	11642041	14.82	9.29	2.05	14.82	14.82	14.82
2049	82805623	10.98	598707	111	11.70	12255814	14.80	57209	07	5243	01	12307801	14.86	9.29	2.05	14.86	14.86	14.86
2050	87107144	10.98	632626	112	11.70	12953027	14.84	59830	07	5690	01	13007187	14.90	9.29	2.05	14.90	14.90	14.90
2051	92022802	10.98	668878	113	11.71	13689445	14.86	62538	07	6165	01	13748077	14.94	9.29	2.05	14.94	14.94	14.94
2052	97008779	10.98	707163	114	11.71	14464375	14.91	65298	07	6667	01	14523145	14.97	9.29	2.05	14.97	14.97	14.97
2053	10227027	10.98	747092	115	11.71	15274630	14.94	68418	07	7199	01	15386041	15.00	9.29	2.05	15.00	15.00	15.00
2054	107817040	10.98	789122	116	11.71	16212755	14.96	71490	07	7783	01	16181302	15.02	9.29	2.05	15.02	15.02	15.02
2055	113863971	10.98	832220	117	11.71	17021050	14.98	74702	07	8361	01	17088191	15.03	9.29	2.05	15.03	15.03	15.03
2056	119820772	10.98	879594	118	11.71	17961095	14.99	78041	07	8994	01	18039041	15.05	9.29	2.05	15.05	15.05	15.05
2057	126377943	10.98	928092	119	11.71	18940303	15.00	81510	00	9686	01	19070227	15.06	9.29	2.05	15.06	15.06	15.06
2058	133187840	10.98	979424	120	11.72	19980230	15.01	85155	00	10378	01	20043013	15.06	9.29	2.05	15.06	15.06	15.06
2059	140396440	10.98	1033300	121	11.72	21063459	15.02	88937	00	11132	01	21141764	15.07	9.29	2.05	15.07	15.07	15.07

APPENDIX E3

Measures of Actuarial Balance

**"Comparing the Level Financing, Average Cost
and HI Methods of Evaluating OASDI and HI
Trust Fund Financial Status," by
John Hambor, Senior Economist,
Office of Economic Policy, U.S. Treasury Department
December 1990**

**COMPARING THE LEVEL FINANCING, AVERAGE COST AND HI
METHODS OF EVALUATING OASDI AND HI
TRUST FUND FINANCIAL STATUS**

John C. Hambor*
Senior Economist
Office of Economic Policy
U.S. Treasury Department

- * The views expressed in this paper do not necessarily reflect those of the Treasury Department. The author wishes to express his thanks to Dean Leimer and Jim Duggan for helpful comments on an earlier draft.

This paper attempts to highlight differences, both technical and interpretative, among the level financing, the average cost, and the "HI" methods, all of which are, or have been, used to evaluate the financial status of the Social Security and Medicare Trust Funds. Such single-valued measures, often referred to as measuring the "actuarial balance" of the fund, are used to establish whether or not the OASDI or HI system is in balance, overfunded, or underfunded for a specified projection period. The measures are conveniently reported as percentages of taxable payroll so that they can be presented on the same basis as the fund's income and cost rates.

The OASDI and HI Boards of Trustees have required that the level financing, or "present value" method be used to evaluate the long-term financial status of both the OASDI and HI Trust Funds--since 1988 for OASDI and since 1989 for HI. The level financing method defines the actuarial balance as the ratio of the sum of annual trust fund surpluses/deficits, discounted by the annual interest rate earned on trust fund assets, to the present value of projected taxable payroll. However, because of the central role played by the interest rate assumption, there has been some concern because the level financing method, while technically correct, depends on a relatively uncertain interest rate projection. There is also a view that the level financing method is inappropriate for the HI Trust Fund¹.

In years prior to 1988, the average cost method was used to measure the "actuarial" balance of the OASDI Trust Fund. It is the 75-year average of the annual OASDI surpluses/deficits (excluding interest income) divided by annual taxable payroll. The more usual way of standardizing annual dollar flows for comparison across time is to discount them using the appropriate rate of interest as in the level financing method.² Level

¹See King, (December 1988). Another reason for this view is that the effect on the level financing measure from changing the real wage growth assumption can be counter-intuitive, i.e., the actuarial deficit could fall if the real wage assumption is lowered. This issue is taken up in an Appendix.

²As shown below, the average cost method can be interpreted as implicitly discounting the annual balances by the annual growth rate in total taxable wages.

financing replaced the average cost method, beginning in 1988, so that the calculated actuarial balance fully accounted for projected interest earnings on the OASDI Trust Fund as it entered a long period of accumulation. It replaced the HI method, in 1989, so that both funds would be evaluated on the same basis.

This paper compares the three methods analytically and highlights their similarities and differences. The following conclusions are based on these comparisons:

- o There is no technical reason why the OASDI and HI Trust Funds should be treated differently when evaluating their individual financial status.
- o Only the level financing (present value) method provides a single-valued summary measure of trust fund financial status that is consistent with achieving a specified target trust fund balance (possibly including zero) at the end of the projection period.
- o The average cost and HI methods are equivalent to the present value method under certain circumstances, but normally should be viewed as potentially poor approximations to that method.
- o The HI method, although normally unsuitable as a single-valued summary measure of financial status, indicates the sequence of annual adjustment factors that would maintain the trust fund on a predetermined path, as long as that path represents both a minimum and maximum trust fund target.
- o The average cost method, if viewed as a multi-period measure, can be interpreted as a special case of the HI method.

In what follows, Section I provides notationally consistent definitions of the three measures. Section II compares the three measures for a special case in which both the

beginning fund balance and the target ending balance are assumed to be zero. Section III relaxes these restrictions and focuses on analytic comparisons of the HI method with the other two methods, treating all three as single-valued summary measures. Section IV analyzes the HI method as a sequence of annual tax rate adjustments and Section V provides a summary and statement of the major conclusions. An Appendix analyzes the impact on the level financing method of a change in the real wage growth assumption.

1. Defining the Measures

The three measures of actuarial balance are shown, in equation form, in the box on the next page. In order to compare them more easily, each is expressed as a weighted average of the difference between non-interest income (T) and outlays (B) (primarily retirement or health benefit payments), i.e., the "cash flow", as a percent of taxable payroll (P).³ The average cost method (AC) and the level financing method (LF) differ only by the weights applied to $(T-B)/P = S/P = s$. The HI method (HI) uses the same weights as the AC method, but subtracts an amount from s , to account for the cost of maintaining a target trust fund balance in every year.

The AC method (Equation (1)) weights annual values of s by $1/n$, where n is the number of years of the actuarial projection (75 years for both the OASDI and HI Trust Funds). Equation (2) expresses the LF method as a weighted average of s , with annual weights equal to the present value of each year's taxable payroll divided by the sum of the present values of all n years of projected taxable payroll (PVP). The interest rate, i , is assumed to be constant throughout the projection period. By a simple algebraic manipulation of Equation (2), LF, also referred to as the present value method, is seen (in Equation (2a)) to equal the present value of projected annual trust fund surpluses/deficits

³For simplicity it is assumed throughout Sections I and II that the beginning fund balance is zero. Section III expands the analysis to the more general case with non-zero beginning and ending balances.

$$(1) \quad AC = \sum_t \frac{1}{n} s_t, \quad \text{where: } s_t = \frac{S_t}{P_t} \quad \text{and} \quad \sum_t \text{ represents } \sum_{t=0}^{n-1}.$$

$$(2) \quad LF = \sum_t \left(\frac{v^t P_t}{PVP} \right) s_t, \quad \text{where: } v^t = \left(\frac{1}{(1+i)} \right)^t \quad \text{and} \quad PVP = \sum_t v^t P_t.$$

$$(2a) \quad LF = \sum_t \left(\frac{v^t P_t}{PVP} \right) \frac{S_t}{P_t} = \sum_t \frac{v^t S_t}{PVP}.$$

$$(3) \quad HI = \sum_t \frac{1}{n} \left(s_t - \frac{v F_{t+1}^* - F_t^*}{P_t} \right).$$

$$\text{If } F_t^* = \alpha^* B_t; \quad (3a) \quad HI = AC - \sum_t \frac{1}{n} \left[\alpha^* \left(\frac{b_t - i}{1+i} \right) \left(\frac{B_t}{P_t} \right) \right], \quad \text{where: } b_t = \frac{B_{t+1}}{B_t} - 1$$

(S), divided by the present value of projected taxable payroll (PVP).

Equation (3) defines the HI method as a weighted average of an expression that equals s minus an amount that provides for maintenance of a target trust fund in each year.⁴ The second term in the brackets is the difference between the present value (in year t) of the target trust fund (F^*) at the beginning of year $t+1$ and the target trust fund at the beginning of year t , standardized by taxable payroll in year t .

If the target trust fund at the beginning of the year is defined as a constant fraction of that year's projected outlays, HI can be rewritten as Equation (3a). In this form, differences between the HI and AC methods are seen to depend on the target trust fund ratio (α^*), the discount factor (v), the projected growth rate of outlays (b), and the ratio of annual benefit payments to annual taxable payroll. The annual maintenance term is neutral,

⁴This formulation is taken from King (December 1988). All trust funds are measured at the beginning of the period.

a net subtraction, or a net addition to the actuarial balance calculated by AC, depending on whether the expression, $(b_t - i)$, is zero, positive or negative. If outlays are expected to rise at a rate equal to the interest rate earned on the fund, the term in brackets is zero because $b_t = i$, and Equation (3a) reduces to Equation (1), the expression for AC. If benefits grow at a rate greater than i , HI implies a smaller surplus (larger deficit) than AC for a given pattern of income and outlays. If outlays are projected to grow at a rate less than i , the HI method implies a larger surplus (smaller deficit) than the AC method.

By showing that each measure is a different weighted average of the s_t 's (or the s_t 's adjusted for fund maintenance in the HI case), the formulas illustrate the point that the method of evaluating financial status should not depend on the particular trust fund being evaluated. Although outlay projections for the OASDI and HI trust funds are not determined in the same manner, there is nothing intrinsic in the separate projection processes that would require different treatment when evaluating financial status. As long as the OASDI and HI Trust Fund cash flows are projected independently of the actuarial balance calculation, i.e., the s_t 's are given in the balance calculation, the choice of method used to evaluate trust fund financial status is not related to the particular fund being analyzed.

II. Relationships Between Measures When the Beginning Fund and Ending Target Fund are Zero

To separate the issue of whether or not actuarial balance measures should allow for a non-zero ending target, or more generally, maintain a particular pattern of target values throughout the projection period, from the issue of level financing versus average cost, this section compares measures without a target fund. To keep the analysis clean, it is also assumed that the beginning fund is zero. Both restrictions are relaxed in the next section. As currently used, the level financing method includes the beginning trust fund balance. When used in the past, the HI method allowed for both a target fund and the beginning

balance while the AC method allowed for neither.

Clearly, from Equation (3), or (3a), the HI method is equivalent to the AC method when the target fund is zero in each year. Comparing LF and AC is somewhat more complicated, but a useful relationship between the measures can be derived by adding the assumption that total taxable wages grow at a constant rate (g) throughout the projection period.

Assume that $P_t = (1 + g)^t P_0$. Then, using Equation (2),

$$(4) \quad LF = \sum_t \frac{v^t(1+g)^t P_0}{\sum_t v^t(1+g)^t P_0} s_t, \quad \text{Let } z^t = v^t(1+g)^t, \quad \text{so that } LF = \sum_t \frac{z^t s_t}{\sum_t z^t}.$$

$$\text{If } g = i, \text{ then } z = 1, \text{ and } LF = \sum_t \frac{1}{n} s_t = AC = \frac{1}{nP_0} \sum_t \frac{S_t}{(1+g)^t}.$$

Thus, if taxable wages grow at a rate equal to the interest rate used to discount the future stream of annual trust fund cash flows (S), the LF and AC methods are equivalent. Further, as the last expression for AC shows, the AC method can be interpreted as a present value method that implicitly discounts the cash flow stream by the rate of growth in total taxable wages.

When the beginning and target fund are both zero and $i = g$, the three actuarial balance measures are equivalent because $AC = LF$ when $i = g$ (and $HI = AC$.) When i and g are both constant, AC and LF differ only because the interest rate differs from the rate of growth in taxable wages. This point was emphasized by the OASDI Board of Trustees in the 1988 OASDI Report, when the LF method was adopted largely because the difference between the assumed interest rate and growth of taxable wages was increasing.⁵

It can be shown that the calculated actuarial balance, based on LF, is precisely the constant annual adjustment to the tax rate⁶ (beginning in the current year) required to achieve the target trust fund at the end of the projection period. The LF method fully accounts for interest earned by the trust fund as it builds, and likewise accounts for interest lost in years when the fund is projected to be negative. The AC method does not accurately account for interest (unless $i = g$), because it implicitly adds interest at a rate equal to the growth of taxable payroll. Similarly, the HI method does not correctly account for interest because, as shown in section IV, it effectively ignores information about the timing of the adjustments required to achieve the trust fund targets. Prior to 1988, the actuarial balance, calculated using the AC method, was informally interpreted as an estimate of the amount by which the payroll tax rate would have to be permanently adjusted to achieve a zero OASDI Trust Fund at the end of the 75-year projection period. This interpretation of AC as an approximation to LF is more accurate the smaller the difference between i and g . Given the currently projected pattern of surpluses and deficits in the OASDI (and HI) programs, if $i > g$, AC would underestimate LF (smaller surplus or bigger deficit) and, if $i < g$, AC would overestimate LF (bigger surplus or smaller deficit.)

Characterizing the financial status of the trust fund in a single summary measure, based on achieving a goal of a zero ending fund, does not require a simultaneous recommendation to initiate, for example, a policy to raise the payroll tax rate when the program is in long-run deficit and thereby initiate, or increase, pre-funding. Rather, noting that the actuarial balance is the change in the tax rate needed to achieve the defined goal of long-run balance is a convenient way of allowing policy-makers to compare, with a single number, the financial status of the program at different points in time; or for a given projection period, among different sets of economic and demographic assumptions. It does not, in and of itself, presume any particular policy action to deal with trust fund imbalance.

⁶The actuarial balance can also be interpreted as the amount benefits, relative to annual taxable payroll, would have to be permanently changed to provide long-run balance.

III. Summary Measures with a Beginning Fund and a Non-zero Trust Fund Target

This section relaxes the restriction of the previous section by incorporating adjustments that allow for the cost of maintaining a non-zero ending trust fund target and adding a non-zero beginning fund balance into the AC and LF measures. First, those methods are modified and compared. Then, the existing HI method, which incorporates a target fund in each year, is compared with the modified LF and AC methods and is shown to be equivalent to both under certain conditions. Finally, a special case is analyzed in which the annual targets in the HI method are interpreted as minimums.

A. Adding a Beginning Fund and Ending Target to LF and AC

In this section only an end-period target case is examined. Continual fund maintenance is considered explicitly in section IV when the HI method is treated as a multi-valued measure. Thus, all measures continue to be considered single-valued measures that represent a constant annual change to the tax or benefit rate over the full projection period. Given current projections of the OASDI and HI Trust Funds, adding a non-zero ending target assures that the cost of maintaining a fund at or above the target value, when projection patterns for economic and demographic variables are relatively stable, is reflected in the actuarial balance. If the projected income and cost rates produce a trust fund pattern that fluctuates around the ending target value, a complex adjustment pattern would be needed to assure that the cost of maintaining the fund at the target level in every year is included in the balance measure. Such fluctuations are more likely to occur, however, with a highly irregular pattern of economic and demographic projections. Normally, the projections converge fairly quickly to stable long-run values and do not exhibit sufficient volatility to produce an irregular trust fund pattern. The need for continual adjustment of the target fund only occurs when the projected fund varies around the target amount. In such instances, however, none of the measures considered thus far will suffice because a *pattern* of adjustments, rather than a constant annual adjustment, would be required to maintain the trust fund at or above the target amount without accumulating excessive funds

in other periods.

Including a beginning balance and ending target is represented algebraically by Equations (1t) and (2t) for AC and LF respectively. If the ending fund target is $F_n^* = \alpha^* B_n$, the AC method can be expressed as:

$$(1t) \quad ACT - \frac{F_0}{nP_0} + \frac{1}{n} \sum_i s_i - \frac{F_n^*}{nP_n} = AC + \frac{F_0}{nP_0} - \frac{\alpha^* B_n}{nP_n}.$$

Adding a beginning balance and ending target, the expression for the level financing method is modified to:

$$(2t) \quad LFT - \frac{F_0}{PVP} + \sum_i \frac{v^i P_i}{PVP} s_i - \frac{v^n P_n}{PVP} \left(\frac{F_n^*}{P_n} \right) = LF + \frac{F_0}{PVP} - \frac{v^n \alpha^* B_n}{PVP}.$$

The terms with negative signs in Equations (1t) and (2t) are the ending trust fund balances divided by the previous period's payroll weighted to be consistent with each definition of actuarial balance. Both ACT and LFT equal zero when AC and LF plus the beginning fund balance (weighted appropriately) equal the negative of the ending trust fund term. Thus, actuarial balance is measured relative to the normalized ending balance. Using the argument developed in section II, Equations (1t) and (2t) imply that $ACT = LFT$ when $i = g$.

B. The HI Method and the End Target Balance Case

1. The HI Method if the Target is both a Minimum and Maximum

In this case Equation (3) (or (3a)) applies directly. If, as observed earlier, the target fund is zero in each year, HI is equivalent to the AC method. With a non-zero target, however, Equation (3) does not necessarily produce the same result as the average cost

method. Only if $i=g$ will the HI method be equivalent to ACT. Further, if HI were redefined by applying the weights used in the LF method instead of $1/n$, it would be equivalent to LFT. To show these results, a general expression for the maintenance term in Equation (3) needs to be developed. Rewrite Equation (3) as:

$$(5) \quad HI = AC - \frac{1}{n} \sum_t \left(\frac{vF_{t+1}^* - F_t^*}{P_t} \right) = AC - M.$$

Noting that at $t=0$, $F_0^* = F_0$ (the actual trust at the beginning of period 0), and expanding the second term in Equation (5), M can be written as:

$$M = \frac{1}{n} \left(\frac{vF_1^* - F_0^*}{P_0} + \frac{vF_2^* - F_1^*}{P_1} + \dots + \frac{vF_n^* - F_{n-1}^*}{P_{n-1}} \right).$$

Assume that $P_t = P_0(1+g)^t$. Then M can be written:

$$M = \frac{1}{n} \left[\frac{F_1^* - F_0(1+i)}{P_0(1+i)} + \frac{F_2^* - F_1^*(1+i)}{P_0(1+g)(1+i)} + \frac{F_3^* - F_2^*(1+i)}{P_0(1+g)^2(1+i)} + \dots + \frac{F_n^* - F_{n-1}^*(1+i)}{P_0(1+g)^{n-1}(1+i)} \right].$$

Collecting terms for the F_t^* 's inside the brackets, and simplifying, results in $n-1$ terms, e.g., for F_1^* and F_2^* ,

$$\frac{F_1^*}{P_0} \left[\frac{(g-i)}{(1+i)(1+g)} \right] \quad \text{and} \quad \frac{F_2^*}{P_0} \left[\frac{(g-i)}{(1+i)(1+g)^2} \right],$$

and terms for a beginning fund and the target fund at the end of the projection period (both as a percent of taxable payroll.) Generalizing, and showing the beginning balance and ending target as separate terms, gives a new expression for HI,

$$(6) \quad HI = AC + \frac{F_0}{nP_0} - \frac{1}{n} \left\{ \sum_{t=1}^{n-1} \frac{F_t^*}{P_0} \left[\frac{g-i}{(1+i)(1+g)^t} \right] \right\} - \frac{vF_n^*}{nP_{n-1}}.$$

From Equation (6) HI and ACT are equal when $g = i$. If the taxable wage bill rises faster than the interest rate (using the currently projected pattern of s_t 's), HI will be less than ACT. If the wage bill rises more slowly than the interest rate, HI will be larger than ACT. Thus, the HI method can be viewed as an adjustment to ACT that more accurately accounts for interest because, when $g > i$, ACT overstates the interest effect and when $i < g$, it understates the interest effect for the current pattern of s_t 's.⁷

If LF weights replace $1/n$ in Equation (3), i.e., as shown in Equation (7),

$$(7) \quad HILF = \sum_t \left(\frac{v'P_t}{PVP} \right) \left(s_t - \frac{vF_{t,1}^* - F_t^*}{P_t} \right) = LF = \sum_t \frac{v'(vF_{t,1}^* - F_t^*)}{PVP},$$

the HI method (with LF weights) is equivalent to LFT regardless of the values of g and i . This equivalence can be demonstrated by applying the method used to develop Equation (6) directly to Equation (7).

2. The HI Method if the Target is a Minimum

A modified form of the HI method is used when the target trust fund is specified to be a minimum only.⁸ This modification would be useful if there were no concern about being above the target, but a substantial concern with maintaining *at least* a predetermined pattern of trust fund balances. In this case, the HI measure effectively ignores individual values of s_t whenever the actual fund exceeds or is equal to the target fund because the HI method equates F^* with F (the actual trust fund) whenever F^* is less than or equal to F , when F^* is defined to be a minimum.

Applying this condition to Equation (3) for all values of t reduces HI to,

⁷It should be noted, however, that Equation (6) may well *overadjust* for interest, i.e., Equation (6) says nothing in general about the size of the adjustment.

$$HI = \sum_t \frac{1}{n} \left(s_t - \frac{vF_{t+1} - F_t}{P_t} \right) - \sum_t \frac{1}{n} \left(s_t - \frac{S_t}{P_t} \right) = 0.$$

Thus, if $F^* \leq F$ for all t , HI is zero. Notice that if the fund were projected to be always above the target, HI would equal zero (i.e., be in balance), while LFT would be positive. A positive value for LFT is an indication of overfunding for a system with a goal of achieving a specific target fund at the end of the projection period.

More generally, when $F \geq F^*$, the contribution of s_t to HI is zero, and, when $F < F^*$, Equation (3) applies. This particular variant of the general form of the HI method was used to evaluate the financial status of the HI Trust Fund until 1988.⁹

IV. The HI Method as a Multi-period Measure

Up to this point, the HI method has been viewed as a measure that provides the same type of information as the AC or LF methods, i.e., a single-valued summarization of the financial status of the trust fund. From this perspective, with income and outgo patterns taken as given, the objective is to summarize that information into a measure that has, as its underlying basis, a goal of achieving a specific target trust fund at the end of the projection period by adjusting the income or cost rate by a constant annual amount. Clearly, only the LFT method can achieve that goal. As the preceding sections have demonstrated, both AC (ACT) and HI must be viewed as approximations to LF (LFT). Their usefulness as proxies for the level financing method primarily depends on whether or not the projected interest rate is close to the projected growth rate of total wages.

The HI method, however, can also be interpreted as a method that treats both the

⁹In 1988, the HI Report used the AC method and in 1989 the HI Board of Trustees shifted to the LF method. In fact, the LF method was not used until 1990 because the actuarial balance was not relevant in 1989 when only short-term projections were presented.

s_t 's and a specific annual *pattern* of target trust fund amounts as predetermined. Adding the latter as an *a priori* condition converts HI into a multi-period measure that can be used to determine each annual increment to the tax rate¹⁰ needed to achieve that year's predetermined trust fund target for a given pattern of annual trust fund cash flows. The HI measure, then, is actually the mean of these increments over the full projection period. Such a measure does not determine the (constant) amount by which the tax rate should be raised each year to reach the ending fund target, but rather is the average of the annual adjustments needed to maintain predetermined fund targets in each year of the projection.

Two specific examples illustrate this point. To facilitate the discussion, rewrite Equation (3), noting that $S_t = vF_{t+1} - F_t$, as:

$$(3*) \quad HI = -\frac{1}{n} \sum_t \frac{v(F_{t+1}^* - F_{t+1}) - (F_t^* - F_t)}{P_t} = -\frac{1}{n} \sum_t R_t.$$

Remember that the HI method implicitly assumes that the target trust fund path is reached in the first period ($F_0^* = F_0$). In subsequent years, R_t depends only on the difference between the target and the actual fund at the beginning of $t+1$, and P_t . That is, the HI method assumes the system is on the target path at the beginning of t so that R_t is,

$$(8) \quad R_t = \frac{v(F_{t+1}^* - F_{t+1})}{P_t},$$

because F_t^* always equals F_t . Equation (8) shows R_t to be the annual increment to the tax rate needed to remain on the predetermined target trust fund path, for given s_t . The HI method merely averages these increments over the projection period (and changes the sign of their sum.)

¹⁰Or, as indicated above, an adjustment to the cost (or benefit) rate.

The first case to be examined defines the target fund as the fund path that results from raising the current tax rate in each year of the projection period by a fixed amount, R^* . Then, in each year, the target trust fund would be:

$$(8a) \quad F_{t+1}^* = (F_t^* + S_t + R^*P)(1+i) ,$$

given that the previous year's target was reached. Substituting Equation (8a) for F_{t+1}^* in Equation (8) shows that R_t equal R^* for all t , so that, in this case, HI equals $-R^*$.

If, for example, R^* were set equal to $-LFT$, the time path of the trust fund would be the time path of the trust fund projected using the s_t 's if the tax rate were permanently adjusted by $-LFT$. In these circumstances, HI would equal LFT . Likewise, if R^* were set equal to $-ACT$, HI would equal ACT .

The second case example is the more standard case in which the target fund is defined to be a constant fraction of annual benefits. Substituting $F_{t+1}^* = \alpha^* B_{t+1}$ as the expression for the target trust fund into Equation (8) gives,

$$(8b) \quad R_t = \alpha^* \left(\frac{vB_{t+1} - B_t}{P_t} \right) - s_t .$$

Equation (8b) shows that, unlike the previous case, R_t varies from year to year. For example, if $\alpha^* = 0$, $R_t = -s_t$, the size of the annual tax rate increment required to maintain a zero fund balance. The current law rate plus the increment equals the pay-as-you-go rate and, in order to achieve the stated objective, it must change annually (assuming s_t changes.) Although the calculated value of HI equals AC in this case, it should be interpreted as the mean value of the increments needed to maintain a zero trust fund in every year rather than as the annual increment that might approximately achieve a zero fund by the end of the projection period.

More generally, with a constant non-zero target ratio, the pay-as-you-go adjustment equals $-s_t$ plus an additional amount that depends on the annual growth of benefits and the

interest rate (as shown explicitly in Equation (3a)). If benefits grow faster than the interest rate, the term is positive and raises the increment above s_t . When the opposite is true, the increment is less than s_t . The HI method is still the mean of the required annual tax rate adjustments, not a single incremental adjustment to the tax rate. The adjustments would, for example, produce an essentially pay-as-you-go rate structure if a relatively small, i.e., a contingency trust fund target, is established.

When the target is treated as a minimum only, no adjustment is necessary for years in which $F \geq F^*$. In this case, however, the adjustments would not produce a pay-as-you-go rate structure because the existing tax or benefit rate would not need to change in those years in which the actual fund was above the target fund. Further, in this case, the R_t s would no longer be unique adjustment factors that maintain a minimum fund.¹¹ The adjustment factors are only unique when the target path is defined as both an upper and lower limit.

V. Summary and Conclusions

The three measures discussed in the paper are normally used as single-number characterizations of trust fund financial status. Implicit in this characterization is the notion that the actuarial balance measures are consistent with a goal of trust fund financial balance defined as achieving a specified trust fund value (possibly zero) at the end of the projection period. In this context, the major difference between the measures is straightforward. The LF method discounts the stream of trust fund cash flows by the interest rate earned on the fund, and thereby fully accounts for interest earnings on the fund (both positive and

¹¹Assume the target fund is zero. Then let the projected fund be positive until year t ($< n$) and negative thereafter. The increments identified by the HI method for years $t+1$ to n are the increments needed to achieve a zero fund in each of those years. However, many other patterns for R_t , including the constant annual adjustment needed to reach an ending fund of zero, would satisfy the (minimum) requirement that the target never be less than zero.

negative) during the projection period. Only the LF method is based on achieving the ending trust fund target by a fixed annual adjustment to the income or cost rate. The AC and HI methods are approximations to LF whose accuracy depends on the size of the difference between annual wage growth and the interest rate.

The HI measure already includes the cost of maintaining the fund on a predetermined path. Because HI equals AC plus a fund maintenance term, the HI method may also be viewed, in appropriate circumstances, as a means of adjusting AC to partially offset the incomplete treatment of interest in the AC method. If the target trust fund is defined as a minimum, the HI method ignores years when the actual fund equals or exceeds the target fund.

Unlike AC or LF (except in a few special cases), the HI measure can be viewed as the mean value of the annual adjustments in the tax rate that would be required to achieve a particular predetermined trust fund amount in each projection year. That is, the HI method determines the adjustments to the tax rate for every projection year which, when added to the rates currently in the law, spell out the yearly rate structure that achieves the target trust fund pattern. The AC method is subject to the same interpretation if the fund is targeted to be zero in every year, in which case, the AC method determines the pay-as-you-go rate structure. Thus, the HI method is a more general form of the multi-valued characterization of AC. This interpretation of HI does not apply if the target fund path is defined to be a minimum.

The previous paragraphs suggest that it would be more productive to regard the AC and HI methods only as multi-valued measures of financial status. It is not appropriate to average the annual increments and treat the result as a measure of financial status, unless the particular financing goal implicit in the calculation can be articulated. The goal associated with the present value method is well-defined and appears to be generally acceptable as an indicator of long-run financial solvency. The definition of long-run financial status that underlies HI and AC, and would transform them into meaningful single-

valued measures, is not apparent. Without a well-defined goal, they are just approximations that implicitly accept the underlying definition of financial solvency inherent in the level financing method.

APPENDIX: THE EFFECT OF A CHANGE IN THE REAL WAGE GROWTH ASSUMPTION ON THE LF MEASURE OF ACTUARIAL BALANCE

The assumed rate of growth of real wages during the actuarial projection period is an important determinant of the measured trust fund actuarial balance, primarily because the taxable wage bill is the major determinant of the level of trust fund non-interest income, although the wage growth assumption can also influence the level of trust fund outlays. In the case of the HI Trust Fund, the effect on outlays is immediate because the economy-wide wage rate is the major determinant of the projected wage bill in the health-care industry, which accounts for more than half of health-care input costs. Contemporaneous OASDI outlays are unaffected by a change in the real wage assumption.¹²

This appendix analyzes the effect on the LF measure when the assumed annual growth of taxable wages per worker, adjusted for inflation, is changed from a rate of $\alpha\%$ to $\alpha^*\%$. Only the annual per worker real wage growth assumption is changed so that both the inflation and labor force growth assumptions remain unchanged. Under these conditions, the projected annual growth rate of the nominal taxable wage bill will increase or decrease by exactly the amount of change assumed for the growth of real wages.

In general, for any actuarial balance measure expressed as a percent of payroll (M), the effect of changing any economic or demographic assumption can be expressed as:

$$(A1) \quad \Delta M = \sum (s_i \Delta w_i + w_i \Delta s_i),$$

$$\text{where } w_i \text{ is the weight, } M = \sum w_i s_i \text{ and } s_i = \frac{T_i}{P_i} - \frac{T_i - B_i}{P_i} - \frac{\tau P_i - (\pi P_i + N_i)}{P_i}.$$

Effect of a New Real Wage Assumption on Measures of Actuarial Balance

From Equation (A1) it is evident that the effect on M of a modified wage rate assumption arises from changes in both s_i and w_i . This section considers changes in s_i and the following section addresses changes in w_i .

¹²Ultimately, OASDI benefits depend on earnings. However, aggregate contemporary earnings bear little relationship to aggregate contemporary benefits, except in a steady-state equilibrium.

The change in S_t (for a given change in wage growth) is,

$$(A2) \quad \Delta S_t = S_t^* - S_t = [\tau P_0(1+\alpha^*)^t - \pi P_0(1+\alpha^*)^t - N_t] - [\tau P_0(1+\alpha)^t - \pi P_0(1+\alpha)^t - N_t],$$

where $P_t = P_0(1+\alpha)^t$, N is outlays unrelated to wages, and an asterisk indicates the values of affected quantities after the real wage assumption is changed. This formulation also allows part of outlays to depend contemporaneously on total payroll as is the case for the HI Fund. The parameter π represents the fraction of total taxable payroll represented by HI payments covering hospital labor costs, and is assumed to be constant throughout the projection period, i.e., health-care labor costs grow at the same rate as economy-wide labor costs

Equation (A2) can be simplified to:

$$(A3) \quad \Delta S_t = P_0(\tau - \pi)[(1+\alpha^*)^t - (1+\alpha)^t],$$

and the change in taxable payroll can be written as:

$$(A4) \quad \Delta P_t = P_0[(1+\alpha^*)^t - (1+\alpha)^t].$$

Note that the change in s_t is approximated by:

$$(A5) \quad \Delta s_t = \Delta \left(\frac{S}{P} \right)_t = \frac{\Delta S_t \cdot P_t - \Delta P_t \cdot S_t}{P_t^2} = \frac{\Delta S_t}{P_t} - \frac{\Delta P_t}{P_t} \left(\frac{S_t}{P_t} \right).$$

Substituting the expressions for the change in S_t and the change in P_t from Equations (A3) and (A4) into Equation (A5) and simplifying, produces the expression:

$$(A6) \quad \Delta s_t = [(\tau - \pi) - s_t] \left[\frac{(1+\alpha^*)^t}{(1+\alpha)^t} - 1 \right] = \frac{N_t}{P_t} [(1+\beta)^t - 1],$$

$$\text{using } (1+\beta) = \left(\frac{1+\alpha^*}{1+\alpha} \right) \text{ and } s_t = (\tau - \pi) - \frac{N_t}{P_t}.$$

Equation (A6) indicates the size of the effect on each of the annual relative cash flow elements (s_t 's) when the real wage assumption is changed from α^* to α . If α^* is less than α , i.e., the real wage growth assumption is lowered, every term from Equation (A6) will be negative so that the sum of the s_t 's must decline. Whether or not M also declines depends on how the change in the real wage assumption affects the w_t .

Effect of a New Real Wage Assumption on the LF Measure of Actuarial Balance

If the weights in the actuarial balance measure are affected by the change in the assumed rate of wage growth, the quantities calculated in Equation (A6) must be further modified as indicated in Equation (A1). If, as is the case for the Average Cost (AC) Method, the weights are constant from year to year, the change in M is determined only by the changes in the s_t 's. However, when the weights depend on the assumed rate of wage growth, as is true of the Level Financing (LF) Method, the effect of a changed wage assumption on the weights also affects M.

To derive an expression for the change in the w_t 's for the level financing measure let:

$$w_t^* = \frac{v^t P_0 (1+\alpha^*)^t}{\sum_t v^t P_0 (1+\alpha^*)^t} \quad \text{and} \quad w_t = \frac{v^t P_0 (1+\alpha)^t}{\sum_t v^t P_0 (1+\alpha)^t},$$

where $v=1/(1+i)$ and i is the (assumed constant) interest rate. In what follows, the denominators in the expressions for w^* and w are denoted by PVP^* and PVP (present value of total payroll over the full projection period) respectively. Then,

$$(A7) \quad \Delta w_t = w_t^* - w_t = \frac{v^t P_t}{PVP} \left[\left(\frac{1+\alpha^*}{1+\alpha} \right)^t \left(\frac{PVP}{PVP^*} \right) - 1 \right] - w_t \left[(1+\beta)^t \left(\frac{PVP}{PVP^*} \right) - 1 \right].$$

Substituting Equations (A6) and (A7) into Equation (A1), setting $M=LF$, and manipulating terms, produces the following expression for the change in LF:

$$(A8) \quad \Delta LF = \sum_t w_t \left\{ s_t \left[(1+\beta)^t \left(\frac{PVP}{PVP^*} \right) - 1 \right] + \frac{N_t}{P_t} [(1+\beta)^t - 1] \right\}.$$

Equation (A8) shows that the direction of change in LF, when the wage growth assumption is changed from $\alpha\%$ to $\alpha^*\%$, is indeterminate. Since w_t is always positive, the second term will be negative for all t if $\alpha^* < \alpha$, and positive for all t if $\alpha^* > \alpha$. The first term, however, depends on the sign of s_t and the term in brackets. The s_t 's can be positive or negative and the sign on the term in brackets depends on α^* , α and i . There is no way to determine, from Equation (A8), whether the first term will be larger or smaller than the second. Thus, in general, the effect of a change in real wage growth on LF is analytically indeterminate.

Normalization by Taxable Payroll

The indeterminacy discussed is the result of normalizing by taxable payroll, not the underlying discounting process. An intuitive way to see this is to remember that LF is simply the ratio of the present value of the projected stream of trust fund cash flows (S_t) and the present value of projected annual payrolls.¹³ From the previous discussion, the present value of the S_t 's will fall if $\alpha^* < \alpha$, and rise if $\alpha^* > \alpha$. Likewise, the present value of payroll falls when wage growth is lowered and increases when it is raised.

The net impact on LF (for $\alpha^* < \alpha$) depends on whether the percent decline in the present value of the projected cash flows is larger or smaller than the percent decline in the present value of projected taxable payroll. If larger, the value of LF will fall further if LF is negative, or rise further if LF is positive. If smaller, the value of LF will rise if LF is negative or fall if LF is positive. If the present value of projected payroll is unchanged, LF is only affected by the change in the present value of the stream of cash flows.¹⁴ The percent decline in the present value of projected payroll depends on the comparative size of α^* , α and i and their interrelationship in the LF formula. It should also be clear that a change in LF opposite in direction from the change in the present value of the S_t 's is not caused by the discounting procedure *per se*, but rather results from normalizing the cash flows and thus, the actuarial balance measure, to annual payroll.

For example, according to calculations by the HCFA Actuary, the HI deficit (using the 1990 II-B Assumptions) is reduced by .07 percent of taxable payroll for each percentage point of real wage reduction while, according to the 1990 OASDI Trustees Report, the OASDI deficit is raised by about 1 percent of payroll for each percentage point of real wage reduction.¹⁵ In both cases, the present value of the projected cash flow stream falls when real wage growth is lowered, but the decline is smaller than the decline in PVP for the HI Fund calculation. This most likely occurs because outlay growth depends on wage growth in the HI projections. Indeed, for the last 50 years of the projection period, the HI projections assume that outlays and wages grow at the same rate.¹⁶

¹³See Equation (2a) in the main body of the text.

¹⁴The same point can be made with Equation (A8) by allowing a specific relationship between the interest rate and the growth of real wages. If $(1+i) = \sigma(1+\alpha)$ and $(1+i^*) = \sigma(1+\alpha^*)$, i.e., the interest rate varies directly with real wage growth, then $PVP = PVP^*$. Such an assumption is consistent with the standard definition of an optimal output growth path in neo-classical growth theory. Applying this relationship, and noting that $s_t + (N_t/P_t) = (r \cdot \pi)$, Equation (A8) reduces to an expression that unambiguously falls when $\alpha^* < \alpha$, and unambiguously rises when $\alpha^* > \alpha$, if, as would be likely, $r > \pi$.

¹⁵See Table 1 in HCFA's "Note to the Files" and 1990 OASDI Trustees' Report, p. 106.

¹⁶See 1990 HI Trustees' Report, p. 63.

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APPENDIX E4

Measures of Actuarial Balance

**"Effect of Change in Economic Assumptions on HI Balance,"
Memorandum from Sol Mussey,
Director of Medicare and Medicaid Cost Estimates,
Office of the Actuary,
Health Care Financing Administration
August 1990**



DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care
Financing Administration

Memorandum

Date August 24, 1990

From Sol Mussey
Office of the Actuary

Subject Effects of the OASDI Technical Panel Recommendations on the HI Program

To Health Technical Panel

HCFA's Office of the Actuary has analyzed the effects of the OASDI Technical Panel's recommendations for the alternative II-B assumptions on the HI program. The results of our analysis are presented in the attached tables and chart. Specifically, the assumption changes analyzed were the recommendations for the CPI, the real wage, and the real interest rate. Additionally, since completion of the 1990 HI Trustees Report, we have determined that admission levels are higher than assumed in the report. Hence, our analysis here is also including projections of higher admission incidence which have been reflected in recent budget projections and which will be reflected in the next Trustees Report.

Table 1 shows the cost of the HI program as a percent of taxable payroll for every fifth year and the 75-year actuarial balance under both the present value method and the HI method. The yearly cost as a percent of taxable payroll figures are for the expenditures of the program only. They do not include any amounts for building or maintaining the trust fund at a target level above zero. We are showing it this way because under the present value method in the 1990 Trustees Report the target trust fund ratio at the end of the 75-year projection period is zero. However, since a zero trust fund balance is not viable in our view, we have included the cost of maintenance of one-half year's outgo in the 75-year actuarial balance estimates under the HI method. Under alternative II-B assumptions, this amounted to .02 percent of taxable payroll.

We started our analysis with the projections under alternative II-B in the 1990 Trustees Report. We first changed the CPI assumption. As indicated in Table 1, the change in the CPI assumption has no effect on the actuarial balance of the HI program under both the present value and the HI methods. This is not surprising, since the increase in the CPI affects the income and the outgo to the same extent. An increase of 1 percent in the CPI with a fixed real wage assumption means that taxable payroll and income increases are 1 percent higher. Also, the 1 percent increase in CPI which causes average earnings to be 1 percent higher affects HI outlays. Both the labor and the non-labor portions of the hospital market basket increase by 1 percent. Therefore, the market basket increases by 1 percent and this is carried through directly to a 1 percent increase in HI outlay increases.

The 1 percent increase in CPI also increases the nominal interest level by 1 percent. Under the present value method, the 75-year actuarial balance is unchanged since the 1 percent increase in income and outlays is precisely offset by the lower discounting factor due to the 1 percent increase in the nominal interest rate. Under the HI method since the year-by-year cost as a percent of payroll is the same, the average cost as a percent of payroll without the maintenance cost will be the same. There may be some slight differences in the maintenance cost under the HI method due to the change in the CPI assumption. However, the difference is not apparent when rounding the percentages to two decimal places.

The second change made was the lowering of real wage assumption recommended by the OASDI Technical Panel. The effect of the real wage change on the HI program is on both the income and outgo sides. Lowering real wages lowers income by the same factor. The lower real wages also affects outgo but only on the wage related portion of costs, which is about 60 percent for HI. Since income is lowered by the full effect of the lower real wages and outgo is lowered by about 60 percent of this effect, cost as a percent of taxable payroll is higher in every year of the projection period. However, the effect on the actuarial balance under the present value method is an improvement in the projected deficit even though the deficit for each single year is greater. This 'surprising' result under the present value method is due to the fact that HI costs are increasing at a much faster rate than income. Therefore, even though the percent reduction in costs is lower, the reduction in absolute cost is much greater. The final result is that the present value actuarial balance is better due to lowering the real wages. The attached appendix shows a mathematical demonstration of this phenomenon. Under the HI method, the lowering of real wages increases the actuarial deficit as one would intuitively expect.

The third change made in our analysis was to increase the real interest rate assumption. As can be seen in Table 1, this change does not affect the year-by-year cost as a percent of taxable payroll. It only affects the 75-year actuarial balance. Under the present value method the 75-year actuarial balance is significantly reduced (by about 12 percent), even though the year-by-year costs are unchanged. Under the HI method, the 75-year actuarial balance is improved slightly due to the higher interest earned on the trust fund which is reflected in the maintenance portion of the cost as a percent of payroll. As mentioned earlier, the maintenance portion of the cost is only reflected in the 75-year figures in the attached tables and not in the selected single years shown.

The fourth change made was an increase in the projected admissions to hospitals. This change reflects trends already observed and is reflected in the latest budget estimates prepared by OAct. It is important to reflect these changes in this analysis since they will be incorporated in the next Trustees Report. This change, along with the OASDI Technical Panel recommendations, gives a possible alternative II-B projection for the 1991 Trustees Report.

Also included in Table 1 is a projection under the best assumptions recommended by OAct. These assumptions are the same as those included in Guy's presentation of projections under realistic assumptions made at the first meeting of the Health Technical Panel with the addition of the new projections in hospital admissions.

Table 2 shows the projection of trust fund ratios under the 1990 alternative II-B assumptions, the OASDI Technical Panel recommendations, and OAct's best assumptions. In each case, the trust fund ratios are shown until the year of exhaustion of the trust fund. The attached chart graphs the trust fund ratios presented in Table 2 and also shows the 75-year actuarial balance under each scenario for both the present value method and the HI method.

The attached tables and chart present results which illustrate one of the reasons why the present value method is an inappropriate indicator of the long-range financial status of the HI program. We have already discussed the 'surprising' result of lowering the real wage gain and improving the actuarial balance under the present value method.

As one can see from the chart, under the OASDI Technical Panel recommendations, in every year of the projection period the status of the trust fund is worse than under alternative II-B. The trust fund ratios are lower in every year and the trust fund is exhausted sooner. However, under the present value method the 75-year actuarial balance is better. It is contradictory that a particular set of assumptions can make the financial status of the HI program worse in every year of the projection period, while making the actuarial balance better. In fact, the cost as a percent of payroll is also worse every year as can be seen in Table 1. This contradiction does not occur under the HI method. It is caused by the flawed present value method. In addition to the present value method not achieving the Trustees stated goal of more accurately reflecting interest, it also fails the other stated goal of providing a higher level of consistency among the measures of financial soundness applied to the program. The HI method is clearly superior in achieving the objectives of the Board of Trustees.



Sol Mussey
Director, OMMCE, OAct

TABLE 1
Cost as a Percent of Taxable Payroll 1/

Calendar Year	1990 TR Alt II-B	Change in Assumptions				
		CPI	Real Wages	Real Interest	Admissions	Best Assumptions
1990	2.56	2.55	2.55	2.55	2.58	2.62
1995	3.13	3.13	3.14	3.14	3.18	3.32
2000	3.69	3.69	3.71	3.71	3.75	4.05
2005	4.12	4.12	4.15	4.15	4.20	4.56
2010	4.68	4.68	4.73	4.73	4.78	5.22
2015	5.47	5.47	5.55	5.55	5.61	6.16
2020	6.18	6.18	6.28	6.28	6.35	6.94
2025	6.99	6.99	7.13	7.13	7.21	7.84
2030	7.69	7.69	7.87	7.87	7.96	8.60
2035	8.12	8.12	8.34	8.34	8.42	9.07
2040	8.32	8.32	8.55	8.55	8.64	9.30
2045	8.42	8.42	8.65	8.65	8.74	9.42
2050	8.52	8.52	8.75	8.75	8.85	9.53
2055	8.63	8.63	8.87	8.87	8.97	9.66
2060	8.75	8.75	9.01	9.01	9.10	9.79

Present Value Method:

Actuarial Balance	-3.26	-3.26	-3.24	-2.84	-2.91	-3.64
Change in balance	0.00	0.00	0.02	0.40	-0.06	
Cumulative change	0.00	0.00	0.02	0.42	0.36	

HI Method 2/:

Actuarial Balance	-3.60	-3.60	-3.73	-3.70	-3.78	-4.33
Change in balance	0.00	0.00	-0.13	0.03	-0.08	
Cumulative change	0.00	0.00	-0.13	-0.10	-0.18	

- 1/ Selected single years shown display program expenditures only, for insured beneficiaries on an incurred basis, as a percent of payroll (no allowance for building and maintaining the trust fund at a target level above zero).
- 2/ Averages shown include allowances for building and maintaining the trust fund balance at the level of at least a half-year's outgo after accounting for the effect of interest earnings.

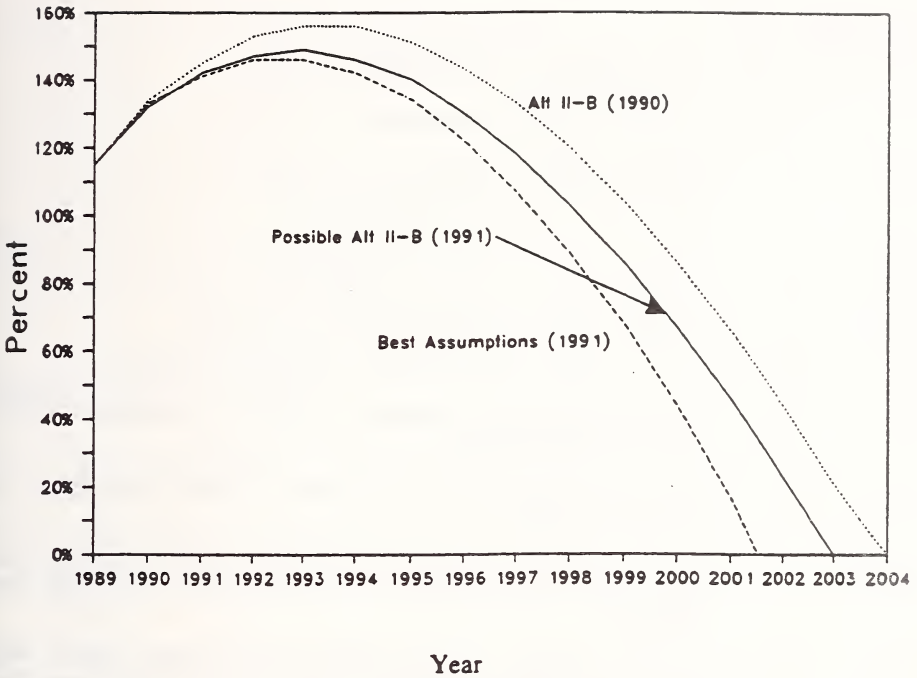
TABLE 2

Trust Fund Ratios 1/

Calendar Year	Alt II-B	Panel Recommendations	Best Assumptions
1989	115%	115%	115%
1990	134	132	133
1991	145	142	141
1992	153	147	146
1993	156	149	146
1994	156	146	142
1995	151	140	134
1996	143	130	122
1997	133	118	107
1998	120	103	89
1999	104	86	68
2000	86	67	44
2001	66	46	17
2002	44	23	4/
2003	21	3/	4/
2004	2/	3/	4/

- 1/ Ratio of trust fund at the beginning of the year to disbursements during the year.
 2/ Trust fund depleted in calendar year 2003.
 3/ Trust fund depleted in calendar year 2002.
 4/ Trust fund depleted in calendar year 2001.

Trust Fund Ratios



Actuarial Balances

	Alt II-B 1990	Possible Alt II-B 1991	Best Assumptions 1991
Present Value Method	-3.26%	-2.91%	-3.64%
HI Method	-3.60	-3.78	-4.33

Appendix

Definitions:

C_1	=	total program costs in year i
t	=	tax rate (assumed constant)
TP_1	=	taxable payroll in year i
R_1	=	non-interest revenue in year i
C_1^{PV}	=	present value of costs for year i
TP_1^{PV}	=	present value of taxable payroll for year i
R_1^{PV}	=	present value of non-interest revenue for year i
r_1	=	reduction factor for revenue in year i to account for lower real wage assumption
r_1'	=	reduction factor for costs in year i to account for lower real wage assumption
AB_{LF1}	=	actuarial balance under present-value method before using lower real wage assumption (ignoring the initial trust fund balance)
AB_{LF2}	=	actuarial balance under present-value method after using lower real wage assumption (ignoring the initial trust fund balance)
AB_{11}	=	actuarial balance for year i before using lower real wage assumption
AB_{12}	=	actuarial balance for year i after using lower real wage assumption

Demonstration of conditions when lowering real wage assumption improves actuarial balance

$$r_1' > r_1 \text{ for all } i$$

$$AB_{12} = \frac{r_1 \cdot t \cdot TP_1 - r_1' \cdot C_1}{r_1 \cdot TP_1} = \frac{t \cdot TP_1 - \frac{r_1'}{r_1} \cdot C_1}{TP_1} < AB_{11} \text{ for all } i$$

$$AB_{LF2} = \frac{t \cdot \sum_{i=1}^{75} r_i TP_i^{PV} - \sum_{i=1}^{75} r_i' C_i^{PV}}{\sum_{i=1}^{75} r_i TP_i^{PV}} = t - \frac{\sum_{i=1}^{75} r_i' C_i^{PV}}{\sum_{i=1}^{75} r_i TP_i^{PV}}$$

$$AB_{LF1} = t - \frac{\sum_{i=1}^{75} C_i^{PV}}{\sum_{i=1}^{75} TP_i^{PV}}$$

$$AB_{LF2} - AB_{LF1} > 0 \text{ when}$$

$$t - \frac{\sum_{i=1}^{75} r_i' C_i^{PV}}{\sum_{i=1}^{75} r_i TP_i^{PV}} - \left[t - \frac{\sum_{i=1}^{75} C_i^{PV}}{\sum_{i=1}^{75} TP_i^{PV}} \right] > 0$$

$$\text{or } \frac{\sum_{i=1}^{75} C_i^{PV}}{\sum_{i=1}^{75} TP_i^{PV}} - \frac{\sum_{i=1}^{75} r_i' C_i^{PV}}{\sum_{i=1}^{75} r_i TP_i^{PV}} > 0$$

$$\text{or } \frac{\sum_{i=1}^{75} C_i^{PV}}{\sum_{i=1}^{75} R_i^{PV}} - \frac{\sum_{i=1}^{75} r_i' C_i^{PV}}{\sum_{i=1}^{75} r_i R_i^{PV}} > 0$$

$$\text{since } R_i^{PV} = t \cdot TP_i^{PV}.$$

Under what conditions does it occur that

$$\frac{r_1' C_1}{r_1 R_1} > \frac{C_1}{R_1} \quad \text{but} \quad \frac{\sum_{i=1}^{75} r_1' C_1^{PV}}{\sum_{i=1}^{75} r_1 R_1^{PV}} < \frac{\sum_{i=1}^{75} C_1^{PV}}{\sum_{i=1}^{75} R_1^{PV}}$$

i.e., under what conditions can each of the annual actuarial balances be worse under the new assumptions but the present-value actuarial balance be improved under the new assumptions?

Let r , r' be the weighted average for all r_1 , r_1'

$$r = \frac{\sum_{i=1}^{75} r_1 R_1^{PV}}{\sum_{i=1}^{75} R_1^{PV}} \quad r' = \frac{\sum_{i=1}^{75} r_1' C_1^{PV}}{\sum_{i=1}^{75} C_1^{PV}}$$

$$\text{then} \quad \frac{\sum_{i=1}^{75} r_1' C_1^{PV}}{\sum_{i=1}^{75} r_1 R_1^{PV}} = \frac{r'}{r} < \frac{\sum_{i=1}^{75} C_1^{PV}}{\sum_{i=1}^{75} R_1^{PV}}$$

whenever $\frac{r'}{r} < 1$ or $r' < r$.

Thus, whenever the growth rates in C_1^{PV} are such the $r' < r$ even though $r_1' > r_1$ for all i , the present-value method will produce an improved actuarial balance when real wage increases are reduced. These conditions occur when costs are growing significantly faster than revenues, as they are in the HI program.

APPENDIX E5

Measures of Actuarial Balance

**Joint Expression of Actuarial Opinion by
the Committees on Social Insurance of
the American Academy of Actuaries and
the Society of Actuaries
August 1989**

JOINT EXPRESSION OF ACTUARIAL OPINION
BY THE COMMITTEES ON SOCIAL INSURANCE
OF THE
AMERICAN ACADEMY OF ACTUARIES
AND THE
SOCIETY OF ACTUARIES
REGARDING
TESTS OF THE ACTUARIAL STATUS
OF THE
OLD-AGE, SURVIVORS, AND DISABILITY INSURANCE AND
HOSPITAL INSURANCE TRUST FUNDS

August 21, 1989

The American Academy of Actuaries is a professional association of actuaries that, as of November 1, 1988, had a membership of about 9,100. The Academy is unique among national actuarial organizations in that all areas of actuarial specialization are represented in its membership. Issues relating to the financing of Social Security and Medicare are part of the responsibility of the Academy's Committee on Social Insurance.

The Society of Actuaries is a professional organization formed to advance the knowledge of actuarial science and to promote the maintenance of high standards of competence and conduct within the actuarial profession. Admittance into the Society is gained after demonstrating proficiency in a rigorous course of study in actuarial science. As of November 1, 1988, there were about 11,100 members in the Society. Issues relating to the financing of the Social Security and Medicare programs are part of the responsibility of the Society's Committee on Social Insurance.

The opinion expressed herein is that of the two Committees and does not purport to represent the views of the American Academy of Actuaries or the Society of Actuaries, or of their individual members.

The Committees have reviewed the 1989 Annual Report of the Board of Trustees of the Federal Old-Age, Survivors, and Disability Insurance Trust Funds (OASDI), as well as the 1988 report for the Hospital Insurance Trust Fund (HI). The Committees note that these Reports are required by law (in Section 201(c)(2) and Section 1817(b)(2), respectively, of the Social Security Act) to include a statement of the actuarial status of the Trust Funds. The Committees believe that this requirement is best fulfilled by the application of specific tests for actuarial soundness.

The OASDI Board of Trustees suggested in its 1989 Report that "a Panel of Financing Experts (consisting of actuaries, economists, and demographers) be appointed by the Advisory Council [on Social Security], and that the panel be instructed to provide advice regarding the measures that should be used to judge the program's short-range and long-range

financial soundness." (The Board made essentially the same suggestion in its 1988 OASDI Trustees Report.) The Advisory Council was selected in June 1989. The Committees support this recommendation, not only for the OASDI Trust Funds, but also for the HI Trust Fund.

The Committees also note that, unfortunately, the test of long-range close actuarial balance was dropped in the 1989 OASDI Trustees Report. This test was established by the 1958 Advisory Council and was included in the 1959 Trustees Report. The test has evolved over time and was used in all subsequent reports through 1988. The test is a key indicator of the long-range actuarial status of the program.

The Committees offer for the consideration of the Boards of Trustees of the OASDI and HI Trust Funds and of the Advisory Council, the following tests for determining the actuarial status of each of the funds:

- (1) the trust fund will be considered to meet minimum short-range contingency-reserve requirements, over the first five years of the projection period, under the following conditions:
 - (a) when the fund ratio is currently over 50%, it is projected to remain above 50%, or
 - (b) when the fund ratio is currently below 50%, it is projected to move above and then remain above 50% and, in addition, the trust-fund balance is able to meet all of its obligations when due,

and

- (2) the trust fund will be considered in long-range close actuarial balance if the 75-year income rate is between 95 percent and 105 percent of the 75-year cost rate.

The purpose of the short-range test is to determine whether the current funding schedule presents an unacceptable level of risk that a trust fund would be unable to meet its obligations in the near future — thus, requiring immediate action to improve the funding situation. The purpose of the long-range test is to determine whether the program is financially viable over the long-range, and to give early warning if changes will likely have to be made (although those changes may not have to become effective for many years into the future). Whenever the long-range test is failed, the Trustees Report should include a description of when the deficits or surpluses occur and of the timing and magnitude of changes that could be made in order to eliminate the actuarial imbalance.

For these tests, the fund ratio at any point in time is defined as the assets of the fund expressed as a percentage of the outgo during the ensuing 12-month period. The income rate for each year is defined as all noninterest income to the trust fund during the year expressed as a percentage of the year's taxable payroll, while the cost rate is defined

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as the total outgo from the trust fund during the year plus an amount to attain and/or maintain the fund ratio at a particular target level, all expressed as a percentage of the year's taxable payroll.

The Committees recommend a target fund ratio of 100%, which is judged to provide an appropriate level of contingency reserves. Amounts held in excess of the 100% fund ratio level are not necessary for the financing of the programs to be considered actuarially sound.

Although there is more than one acceptable method of combining the 75 single-year rates in the projection period into a single 75-year rate in order to determine the long-range actuarial balance, the method used should take into account interest earnings of the trust funds, the starting fund balance, and the target fund ratio. In addition, whatever method is used should describe the funding patterns implied in the results presented.

Neither the method used to calculate the actuarial balance in the 1989 OASDI Trustees Report nor the method used in the 1988 HI Trustees Report satisfies all of these criteria. The method used in the 1989 OASDI Trustees Report does not include the cost of attaining and maintaining a target fund ratio, nor does it describe the funding pattern implied in the 75-year actuarial balance calculated on the "level-financing" basis. The method used in the 1988 HI Trustees Report does not include direct recognition of interest earnings of the trust fund, nor does it include the cost of attaining and maintaining a target fund ratio.

Finally, the Committees recommend that the projected actuarial balance should be tested against specific criteria (of the type suggested above) and that the reports should state that the actuarial status is satisfactory or unsatisfactory depending on the results of the tests.

In summary, the Committees agree that:

- (1) the 1989 OASDI Trustees Report should have included a test for close actuarial balance,
- (2) tests of actuarial status should be used in both the OASDI and HI Trustees Reports beginning in 1990, and they should be stronger than those used in the past,
- (3) any failure to meet these tests should be taken seriously by the Boards of Trustees and reported accordingly,
- (4) additional studies of the appropriate tests for determining the actuarial status of the OASDI and HI programs should be undertaken, and
- (5) tests for determining actuarial status should not be modified or eliminated without appropriate analysis and justification.

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APPENDIX E6

Measures of Actuarial Balance

**"Measures of Actuarial Status of the OASDI System,"
by Richard Foster, F.S.A., Toni Hustead, A.S.A.,
and Stephen McKay, F.S.A.
March 1988**



THE OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-4000

FORCE MANAGEMENT
AND PERSONNEL

March 30, 1988

MEMORANDUM FOR AMERICAN ACADEMY OF ACTUARIES
COMMITTEE ON SOCIAL INSURANCE

SUBJECT: Opposing Viewpoint

In our last meeting I offered to write a paper containing my opposing viewpoint on using interest in an actuarial balance formula for the OASDI system. That paper (co-authored by Steve McKay and Rick Foster) is enclosed and has been sent to John Wilkin for use at the Society meeting in April.

I look forward to your comments on this paper and hope that both perspectives will better enable the Committee to decide upon a position.

Sincerely,

Toni S. Hustead
Chief Actuary
DoD Office of the Actuary

Enclosure:
As stated

cc: Steven McKay
Rick Foster
John Wilkin
Steve Kellison
Christine Nickerson

Measures of Actuarial Status of the OASDI System

by Richard S. Foster, F.S.A., Toni S. Hustead, A.S.A.,
and Steven F. McKay, F.S.A.

The Old-Age, Survivors, and Disability Insurance (OASDI) system involves promises of benefits to nearly everyone in the United States. Those promises extend into the indefinite future; benefits for someone just entering the work force may not begin until 45 years from now, and they may continue another 30 years beyond that time. Individual financial plans are based on those promises; we must make every effort to ensure that the benefit promises being made today can, in fact, be fulfilled. If there is any question about the ability of the country to meet those promises, then the issue should be opened up for discussion with the American people. This responsibility was formally recognized by the U.S. Congress in section 201(c) of the Social Security Act, where the Board of Trustees of the OASDI Trust Funds is required to prepare an annual "statement of the actuarial status of the Trust Funds." We will therefore set the following as the goal of the measurement of actuarial status: To inform the Congress and the public of the projected costs and sources of funding of the OASDI system, and to state whether the funding is expected to be sufficient for the costs.

Introduction to actuarial status

The Social Security Act does not specify how to measure the actuarial status of the trust funds. The OASDI system is similar in some ways to private pension plans, and so any measure adopted for the OASDI system could be compared with the measures used in those plans. A private pension plan is valued "in isolation"; that is, income to the plan is compared to outgo from the plan and there is no general concern about the effects of the plan's operations on the plan sponsor or the economy at large. This basic idea of viewing the plan in isolation for valuation purposes has also been used in valuing the OASDI system from its inception. It has been generally successful in providing guidance for the evolution of the OASDI system, but changing conditions may mean that the valuation in isolation is now insufficient. This paper will compare the valuation in isolation to a more universal valuation and will consider which type of measure of long-range actuarial balance is appropriate for the two types of valuations.

There are some important differences between the OASDI system and private pension plans that are critical when determining which measure is appropriate for OASDI, and whether a valuation in isolation is sufficient:

- (1) The OASDI system is inextricably linked to the rest of the budget of the Federal Government. The trust funds were "off-budget" until they were included in the unified budget of the Federal Government beginning with fiscal year 1969. In fiscal year 1988, the trust funds were removed from the unified budget, but they are still considered to be part of the Federal budget when applying the Gramm-Rudman-Hollings automatic deficit reduction mechanism. Consequently, one can assume that these trust

funds still exist within the unified budget as far as taxing, borrowing, and deficit levels are concerned.

- (2) The OASDI Trust Funds invest solely in a special series of U.S. Government securities. Any excess of trust fund income over outgo is invested in these securities, which means that the money is given to the Treasury to be used for general government purposes. When the money is needed by the trust funds to pay benefits (or other expenses), the Treasury gives money to the trust funds by drawing down its daily cash reserve (which is maintained from ongoing tax receipts and the sales of Treasury securities to the private sector and to foreign countries). While the trust funds hold the special-issue bonds, they earn interest at a rate determined by a formula in the Social Security Act (section 201(d)). That formula currently reflects the average market yield for long-term government securities on the open market. The formula has been changed from time to time and it could be changed in the future at any time and for any reason, when the Congress deems it appropriate.

A detailed description of the funding transaction process is in the Appendix.

Types of measures of long-range actuarial status

Various methods of measuring the long-range actuarial status of the OASDI system have been used over the decades of its existence. These methods can be grouped into three basic types: (1) average costs, (2) year of depletion of trust fund, and (3) present values.

Since 1973 the long-range actuarial balance of the OASDI system has been measured by comparing the cost of the system as a percentage of payroll, averaged over 75 years, to the average income as a percentage of payroll. Each year's cost and income, as a percentage of payroll, is given equal weight in the averaging. This average-cost method has the advantage of simplicity (both in terms of calculation and explanation of the results), and it produces a summary "cost rate" statistic that is representative of the average future cost of the program. Simplified calculations may no longer be much of an advantage in today's computerized office, but simplified explanations are always useful. The "average cost" method does not reflect the pattern of income and outgo, nor the full effects of interest.

In addition to the average-cost method being used to measure the long-range OASDI balance, the progress of the trust funds has also been projected to the end of the long-range period. For example, based on the alternative II-B set of assumptions in the 1987 Trustees Report, the OASI and DI Trust Funds were projected to accumulate substantial balances before becoming depleted in 2055 and 2023, respectively. Using only the year of depletion of the trust fund as a measure of long-range balance is simple and recognizes the pattern of income and outgo to some extent. The method recognizes the effects of interest but can be extremely sensitive to seemingly minor variations in assumptions.

Prior to 1973 the long-range balance was measured by comparing the present value of income to the present value of outgo, expressed as percentages of the present value of future payrolls. This present-value method was similar to that used in private pension plan valuations, except that an "open-group" method was used for OASDI, as opposed to a "closed-group" method in private

pension plans. The open-group method allows for contributions by new entrants to the system, while the closed-group method considers only current participants in the system or plan. The present-value method reflects the effects of interest. It does not reflect the pattern of income and outgo, it is difficult to explain, and it yields a summary cost statistic that is not representative of actual future cost levels (because income and outgo in the latter part of the valuation period are discounted more heavily than corresponding amounts in the near future).

Private pension plan valuations extend to the death of the last participant. In the early years, the OASDI measure paralleled this method by considering income and outgo into perpetuity. In 1965, however, the valuation period was shortened to 75 years, in spite of the fact that at least some OASDI experts believed that that was not actuarially correct: "Under the open-group concept, the length of the valuation period is very important. Ideally, from a purely actuarial viewpoint, such period should be infinite, but laymen sometimes have difficulty in understanding how level costs can be derived on this basis." (Social Security, third edition, by Robert J. Myers, p. 356). We agree that the infinite valuation period is preferable, for reasons described in the next section.

The present-value method and the average-cost method are closely related, when the present values are shown as percents of payroll and the valuations are prepared for the same valuation period. The average-cost method can be viewed as a present-value calculation, where the interest rate used to compute the present values equals the percentage growth in payroll in each year. The implied interest rate for each year, however, would equal the assumed interest rate used for projecting interest earnings only by coincidence. Conversely, the present-value method can be viewed as an average-cost method, where a different weight is assigned to each year's cost or income.

Thus, the average-cost method is an "imperfect" present-value method, and the present-value method is an "imperfect" average-cost method. Neither argument proves that one method is faulty, unless we can prove a priori that the other method is preferable. We believe that each method should be considered on its merits, rather than arbitrarily saying that one is preferable, or that one is imperfect when judged on the basis of the other's standard.

Current actuarial status

The average-cost method came into use when there was general agreement that the OASDI system would be, and should be, funded on a current-cost basis. The averaging of incomes and outgoes would give an accurate picture as long as those incomes and outgoes were generally matched year-by-year. The 1983 amendments (and, to some extent, the 1977 amendments) to the Social Security Act weakened the assumption that the OASDI system would be funded on a current-cost basis, in that projections since that time have consistently shown the trust funds building to high levels before being disinvested in following years. We have not yet reached those high levels, and many people question whether we ever will, or should, build large trust funds.

For perspective on the size of the projected OASDI Trust Funds, consider that in the 1987 Trustees Report, based on the intermediate set of assumptions, the OASDI Trust Funds were projected to reach a level of over 5 years' worth of outgo from the trust funds in 2015. In 1988, that would be over \$1 trillion. Interest on the trust funds would be equivalent to about 30 percent of outgo. These levels are much higher than anything experienced since the early years of the system. Currently, the trust funds are at a level of about 3 months' worth of outgo, and interest income is equivalent to about 2 1/2 percent of outgo.

Just as important as the large fund buildup is the drawdown from the funds after 2015-2020. Current methodology implies that payroll tax rates that are insufficient to pay benefits in the middle part of the next century will be supplemented by interest income on a large trust fund, and by disinvestments from that trust fund. An evaluation of the program's financial status in isolation does not question the nature of this principal and interest; they are treated as normal income to the program, and their source is not considered. Under present circumstances, however, we suggest that it is necessary to examine the nature of the assets in the trust funds and the interest on those assets so as to determine whether we should treat them as real cash flows into the OASDI system in those years.

The OASDI Trust Funds have, in fact, been running surpluses since the 1983 amendments were enacted. Those annual surpluses are projected to increase from about \$40 billion currently to about \$60 billion when the 1990 payroll tax increase takes full effect. But those surpluses are dwarfed by the deficit in the remainder of the Federal Government, producing net deficits (when the OASDI accounts are combined with those of the rest of the Federal Government) of about \$150 billion. What has been happening to the OASDI surpluses? They have been invested in special issue bonds sold by the U.S. Treasury. The Treasury, in turn, has made the cash available for spending by other parts of the Federal Government. The OASDI surpluses have merely reduced the borrowing required by the Treasury from the private sector and from other countries, without resulting in any actual "investments".

If this situation were to continue, it would imply that the OASDI system would be funded by payroll taxes until about 2020. At that time, the OASDI tax rate would be insufficient to pay for benefits, and the OASDI Trust Funds would have to depend on interest on and disinvestments from its special issue bonds for part of their financing. Where would the cash required to pay the principal and interest on the bonds come from? The picture is the reverse of the one described in the previous paragraph. The Treasury would have to (1) increase its borrowing from the private sector and from other countries to raise the cash necessary to fund the deficiency in the OASDI system, or (2) raise taxes. This is an additional strain on the overall Federal budget, one not anticipated by any measure of actuarial status that treats the OASDI system in isolation. Alternatively, if the strain on the budget were judged to be too heavy, benefit payments could be reduced (in which case, today's benefit promises would not be fulfilled).

Currently, then, the OASDI program is said to be in close actuarial balance, and the concept of a fund accumulation for purposes of helping to pay the cost of the baby boom's retirement is widely known and accepted. In reality, however, due to continuing deficits in the rest of the Federal Government, we are not accumulating a true fund and are instead merely

accumulating a right to future government revenues. The expected trust fund buildup will not (1) lower future costs, (2) lower total future taxes, or (3) generate faster economic growth (to make higher future taxes easier to absorb). Under these circumstances, the public is, at the minimum, gaining a false impression about the ability to prepare in advance for the financial effects of the baby boom's retirement. In addition, they may be gaining a false impression about the financial resources that will be required, after the baby boom retires, to finance the program.

What are the implications of being out of close actuarial balance? Various modifications have been made to the OASDI program in times of imbalance to bring it back toward balance: (1) benefits have been reduced, (2) taxes have been raised, (3) other sources of revenue have been created, and (4) the trust funds have been allowed to run down (for temporary periods), increasing the need for Federal borrowing from the private sector and/or for increased taxes to meet the cash needs of the remainder of the Federal budget. We submit that that is exactly the situation facing us after 2020. We do not meet the goal of informing the American people of the costs and of the sources of funding of the OASDI system when we merely tell them that the present system is in balance by normal standards. We must inform them of underlying peculiarities and warn them that such peculiarities tend to weaken the validity of the normal standards.

Use of an infinite valuation period (or at least one that extends beyond the end of the 75-year period currently used) would help to point out the weaknesses of the expected pattern of funding. Reasonable projections show a relatively stable pattern of trust fund outgo exceeding income starting in about 2020. Disinvestments from the trust funds mask the problem for a few decades, but even these large funds run out. Extensions to the projections beyond 75 years show continuing OASDI deficits for which there is no planned source of funding. These problems can be reasonably foreseen now; we should plan for them now.

What measure should be used

To decide what measure should be used for future valuations of the OASDI system, we first must decide what information we need to convey. In this regard, there is this simple truth: The American people can have any OASDI system that they are willing to pay for. The OASDI system is in balance if the American people are aware of the projected costs and sources of funding, and find them acceptable. It is not necessary for the payroll tax rate to be sufficient to cover the costs each year. It is not necessary to build up a large trust fund in advance of the retirement of the baby boomers and to disinvest from the trust fund in later years. In fact, no trust fund is necessary. Income to the trust funds could be commingled with general Federal revenues and outgo could be merely part of the total Federal budget. We are in that situation already, except for handwritten journal entries that say "special issue bonds issued to the OASDI Trust Funds." In practice, the device of trust fund accounting has certain desirable attributes; one of them being the discipline it adds to the process of informing the public as to current and future program costs. As noted, however, it can also obscure important issues.

The present-value method of measuring long-range balance takes direct account of what we consider to be problematical interest income, and thus

would add to the misunderstanding described above. As such, we believe that adoption of the present-value method would be a step in the wrong direction. The following scenario illustrates how this reliance on interest income can produce misleading or false results:

The Congress passes and the President signs an act which changes the formula for determining the interest rate credited on the special issue bonds held by the OASDI Trust Funds. The new rate equals the market yield on long-term government bonds, plus 2 1/2 percentage points. The sponsors of the bill justify this change by saying that this brings the yield on the trust fund assets more in line with the yield on private pension trust funds, which are invested in higher-yielding corporate bonds and stock. As a result, the OASDI Trust Funds are credited with much higher interest income. The Treasury does not have to raise taxes or increase borrowing from the public to provide actual money to the trust funds. This interest income shows up in the trust funds as IOU's from the Treasury. Because of the higher interest rate, the actuaries increase their interest rate assumption to reflect the new rate in the law. The long-range actuarial balance improves by roughly 1 percent of payroll, using the present-value method, bringing the OASDI system into a surplus position. The projected trust funds increase to much higher levels and stay positive even beyond the 75-year long-range period.

In this scenario there was no change in the ability of the U.S. economy to pay for the OASDI system. There was no change in the taxes designated to fund the OASDI system. However, the present-value method concluded that the system was in balance. We do not believe that this is a desirable outcome. When the payroll tax becomes insufficient to pay benefits, additional Federal borrowing or other sources of revenue will have to be drawn upon. Benefits will continue to be paid, but not by payroll taxes and interest income as implied by the present-value method.

This example points out the basic problem with the present-value method; It depends on interest income that is divorced from the real world. We believe that the system will be funded on a pay-as-you-go basis even with the accumulation of a large trust fund for the OASDI system. Any trust fund is merely a convenient paper exercise. Since the year-of-depletion-of-trust-fund method suffers from the same dependence on illusory interest income, it would also be undesirable as the sole measure of actuarial balance. Thus, we believe that the average-cost method, although imperfect, is more appropriate than the present-value method or the year-of-depletion method.

The following scenario may seem extreme, but is in fact merely an exaggeration of past real-life proposals (e.g. counter-cyclical general revenue financing) and actual OASDI legislation (e.g. reimbursement for military service credits):

The Congress passes and the President signs an act which provides for the immediate crediting to the trust funds of an amount equivalent to the payroll taxes lost since the beginning of the program because of excess unemployment. The sponsors of the bill justify this reimbursement on the basis that it was the Federal Government's fault, not the fault of the OASDI Trust Funds, that the trust funds failed to receive that income.

After 1 month of calculations, the actuaries determine that the trust funds should be credited with \$567 billion (a made-up, but not unrealistic, figure). That amount is deposited in the trust funds overnight, by putting an IOU in the trust funds for \$567 billion. The long-range actuarial balance improves by \$567 billion, using the present-value method, bringing the OASDI system into a surplus position. The projected trust funds increase to much higher levels and stay positive even beyond the 75-year long-range period.

As in the first scenario, there has been no change in the ability of the U.S. economy to pay for the OASDI system, and no change in the actual level of resources that would be required, year by year.

Conclusion

It is no longer sufficient to perform only an "in-isolation" analysis of the financial status of the OASDI program. When the magnitude of the interest and principal amounts needed to finance future benefits becomes large, one must also consider the source of funding for these income amounts. In the face of continuing overall Federal deficits, it is misleading to suggest that the burden of supporting the baby boom in retirement can be advanced in time and paid for in part by the baby boom generation itself.

We believe that it is still necessary, and appropriate, to perform an "in-isolation" review of the program's financial status--but only as a first step. To avoid misunderstanding, it is also necessary to indicate the limitations of such a review and to discuss fully the appearance versus reality of partial advance funding. Only then will we meet the ultimate goal of informing the Congress and the public of the projected costs and sources of funding.

We believe that the ultimate costs of the OASDI system (beyond the current 75-year valuation period) should be recognized in some manner. A pattern of large trust-fund buildup followed by rapid disinvestment from and depletion of the trust fund, with no planned source of funding for the deficit after depletion of the trust fund, is improper for a social insurance program. Such a pattern should not be characterized as in actuarial balance without a full discussion of the unusual aspects and long-term implications of the financing basis.

The average-cost method in use currently does not produce the results of a "perfect" measure. The present-value method of determining actuarial balance is reasonable in the context of an in-isolation analysis, although it is open to manipulation as shown in the illustrative scenarios above. In a broader or universal context, the present-value method is inappropriate and would add to the current confusion. For this reason, we do not currently support such a change. The subject clearly deserves a study of great depth and we have only scratched the surface.

Appendix

TRUST FUND TRANSACTIONS WITHIN THE UNIFIED BUDGET OF THE FEDERAL GOVERNMENT

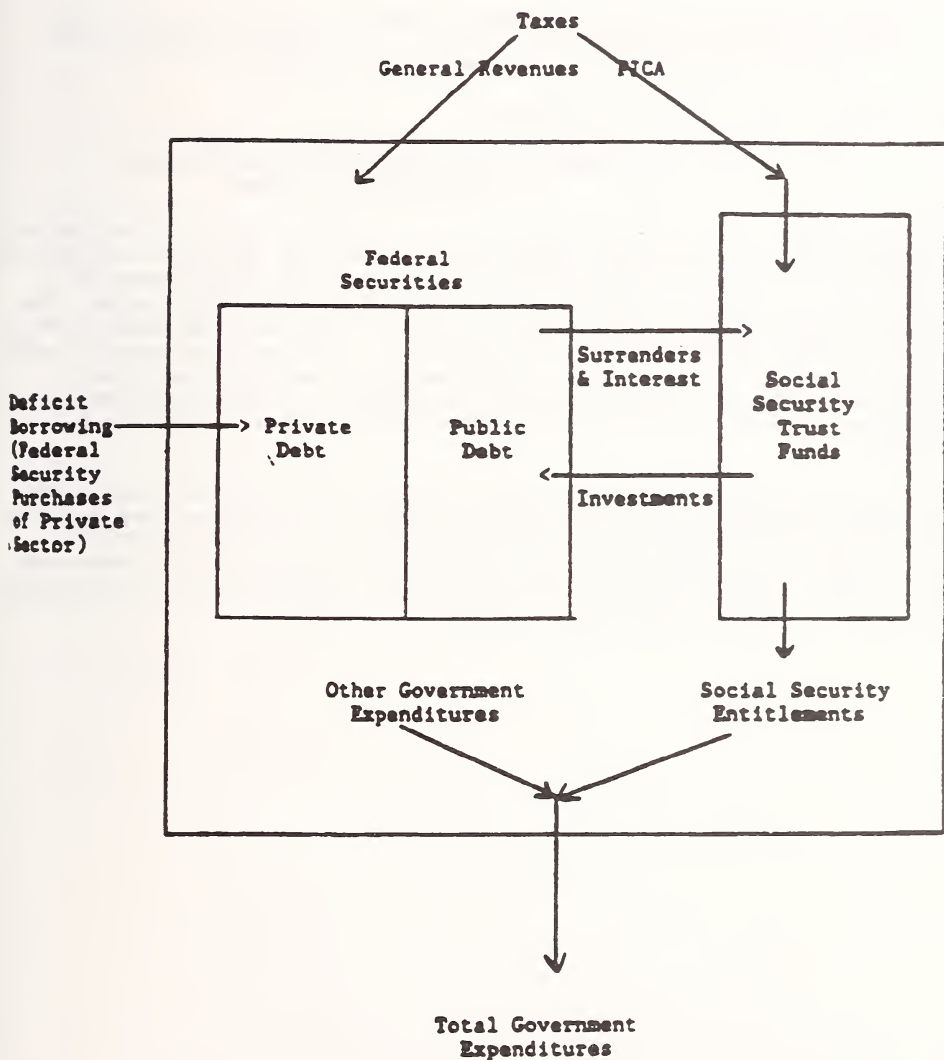
President Johnson moved the OASDHI trust funds into the Unified Budget of the Federal Government in order to balance the budget. Immediately before this move, the trust funds were "off-budget". In fiscal year 1988, the trust funds were removed from the Unified Budget to again take an off-budget status. However, the Gramm-Rudman automatic deficit reduction mechanism considers these trust funds when determining the deficit. Consequently, one can assume that these trust funds still exist within the Unified Budget as far as taxing, borrowing and deficit levels are concerned. It should be noted that for simplicity the ensuing analyses assume that a deficit situation exists, that the OASDHI trust funds are one trust fund and that that fund exists within the Unified Budget.

Figure I is a simplified diagram of the budget process. The outer line signifies the Unified Budget of the Federal Government. The only transactions that affect the annual deficit of the Unified Budget are those which pass in or out of the government such as taxing and dispersing. Intragovernmental transfers (such as crediting interest to a trust fund invested in Federal securities) are both debits and credits within the Unified Budget and have no effect on the deficit.

The following examples illustrate this transfer process:

1. If the Social Security trust fund purchases a \$10 billion Federal security from the Treasury, the fund debits \$10 billion and the Treasury credits \$10 billion - net Federal budget deficit effect is zero.
2. If the Treasury pays the Social Security trust fund \$.7 billion in interest income, then the Treasury debits \$.7 billion and the fund credits \$.7 billion - net Federal budget deficit effect is zero.
3. If the Social Security trust fund disinvests \$20 billion worth of Federal securities that it previously purchased, the Treasury debits \$20 billion and the fund credits \$20 billion - net Federal budget deficit effect is zero.
4. If the Social Security trust fund has no balance in the fund (hence no securities to surrender) then a law could be passed to move monies into the trust fund from general revenues. The Treasury debits \$300 billion and the fund credits \$300 billion - net Federal budget deficit effect is zero.

Figure I
UNIFIED BUDGET OF THE FEDERAL GOVERNMENT



The four examples demonstrate that 1) purchasing Federal securities with monies from the trust fund, 2) crediting interest income to the trust fund, 3) surrendering securities to provide cash for the trust fund, and 4) moving monies from general revenues into a "broke" fund, have absolutely no effect on the deficit in any one year. Stated more bluntly, in the deficit environment the Social Security system is on a pay-as-you-go basis no matter how big the fund accumulation. The only annual Social Security transactions that affect private borrowing levels (deficits) are incoming taxes and outgoing entitlement payments.

Look once again at Figure I. The equation is:

$$\text{Deficit Borrowing} + \text{Total Taxes} = \text{Total Outlays.}$$

The equation could be further stated as:

$$\text{Deficit Borrowing} + \text{Total Taxes} - \text{Social Security Outlays} = \text{Other Federal Outlays.}$$

Current Federal fiscal policy sets a deficit borrowing goal. Let us look at a hypothetical year where the taxes have been set (i.e. the FICA rate and the other tax rates) and the Administration has stated that Social Security entitlements are sacred and will not be reduced to meet deficit goals. The balancing item would be other Federal outlays. FICA taxes are greater than Social Security entitlements in this year, so other Federal outlays are more than they would be if the excess Social Security amounts did not exist. Excess Social Security monies are not transferred to other generations of taxpayers, they are used now to pay more outlays to this generation of taxpayers.

Another year may be similar except that FICA taxes are less than Social Security entitlements, so other Federal outlays are lower than they would be if the negative net Social Security transactions did not exist. Annual negative net Social Security transactions reduce outlays to this generation of taxpayer no matter how large the fund might be and how much interest might be earned on the fund (see prior examples 2, 3, and 4).

APPENDIX F

Estimates of Benefit Changes that Would Balance HI

**Office of the Actuary
Health Care Financing Administration
October 1990**



DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care
Financing Administration

Memorandum

Date October 25, 1990

From Sol Mussey
Office of the Actuary

Subject Recommendations to Put the HI Program in Actuarial Balance

To Health Technical Panel

The Health Technical Panel asked us to determine the impact of putting the HI program into actuarial balance over the 75-year projection period by varying three specific items which affect the cost of the program. The three items to vary are 1) the admission rate assumption, 2) the PPS update factor, and 3) the inpatient hospital deductible.

First, we looked at the admission rate assumption. We were asked to determine how much admissions would have to be reduced in order for the HI program to be in actuarial balance over the 75-year projection period. The result is that admissions would have to be reduced by about 52 percent to put the program in actuarial balance. This was obtained by reducing the number of admissions by a uniform percentage over the 75-year projection period. Note that such a uniform percentage reduction in admissions would result in a large trust fund buildup and subsequent decline. If we assumed that admissions did not have to be reduced until the trust fund was exhausted (or dropped below a target level), then admissions would have to be reduced even more beginning early in the next century.

Next, we looked at putting the HI program in actuarial balance by reducing the PPS update factor for inpatient hospital payments. In order to achieve actuarial balance over the 75-year projection period, the PPS update factor would have to be about 2 percent lower each year than the update factors in the current law baseline projection. This represents a 36 percent decrease on average in the annual update factor. Current law projections assume the update factor is equal to the hospital market basket in fiscal year 1994 and later. For fiscal years 1991 to 1993, OBRA 1990 provided for updates lower than the full hospital market basket. Again, as with the admission assumptions, this assumes a uniform reduction in the update factor in each year of the projection period. If the update factor was not reduced until the trust fund was exhausted (or dropped below a target level), the update factor would have to be reduced even more.

The third item we looked at was increasing the HI inpatient deductible in order to put the program in actuarial balance. Without taking into account the relationship between costs and coinsurance amounts, the deductible would have to be raised to about \$3300 to achieve the desired goal. However, since the coinsurance rate for skilled nursing care (SNF) is tied to the inpatient hospital deductible under current law (one-eighth of the deductible), it impacts the SNF expenditures. One eighth of \$3300, or \$412.50, is much higher than the average cost per day in a SNF. Hence, the deductible would have to be even higher to make up for the coinsurance amounts that would not be collected from the SNF benefit.

The same problem occurs with the hospital coinsurance days and lifetime reserve days. The daily coinsurance amounts for these would be \$825 and \$1650, respectively. The total coinsurance amount could in some cases total more than the actual payment to the hospital. The excess amount would then need to be made up by raising the deductible further. Adjusting for this effect, we determined the deductible would have to be around \$4200. Even \$4200 is likely to be on the low side. With a deductible that high, there will be some beneficiaries who use hospital services but do not reach the deductible amount. This is likely to happen with short stays in low cost areas. The additional increase to the deductible could be estimated by looking at inpatient hospital expenditure distributions by benefit period. However, due to time constraints, we were not able to do this in such detail.

All of the estimates done for this project were based on the 1990 Trustees Report, alternative II-B assumptions. All estimates are rough and could be different if more detailed analysis is done. However, these estimates do give a rough order of magnitude of the extent of change required for each item in order to put the HI program in actuarial balance. The estimates presented in this note are another way of illustrating the seriousness of the financing problem of the HI program.



Sol Mussey
Director, OMMCE, OAct

APPENDIX G

Estimates of the Ratio of HI Benefits to Contributions

from

"Fair Play Between Parents and Children,"

by Guy King and Solomon Mussey, *Contingencies*

September-October 1989

and Updated Estimates, July 1990

Fair Play BETWEEN Parents & Children

By Guy King and Solomon Mussey

All your working life, you pay FICA taxes, trusting in the premise that, when you come to retire, the funds will be there for your monthly Social Security check and your hospital bills. But is this trust ill-founded? Will the money be there when you need it? Or will the government's generosity to the current generation of retirees mean that future generations will be shortchanged? The notion that continued faith in the several social insurance programs of the federal government relies upon fair treatment among future, current, and retired workers is captured in the phrase "generational equity."

Doubts about whether equity among generations has been properly planned for are particularly appropriate in regard to the hospital insurance (HI) program of Medicare: its trust fund is projected to become depleted early in the next century. There is a real danger that, in the rush to find some way to remedy the fund's financial health, the issue of generational equity may fall by the wayside, thereby jeopardizing the tenuous agreement that links the generations in social insurance programs.

The HI program—Part A of Medicare—pays the inpatient hospital bills (and other related care) for most people 65 and older, as well as for people with long-term disabilities. In 1988, about 29 million people over age 65, and about 3 million disabled people under age 65, were covered under HI. Their benefits were financed primarily by the contributions of 131 million U.S. workers, through payroll taxes authorized by the Federal Insurance Contribution Act (FICA). In this way, the HI program affects just about everyone who works.

The concept of generational equity is one of the central precepts upon which the success of the several social insurance programs financed by FICA has been built. (In addition to HI, FICA-based entitlements include Old Age, Survivors, and Dis-

ability Insurance—OASDI.) Because the benefits from these programs are paid to the currently retired generation, but financed by the current working generation, they may be thought of as agreements, or compacts, that are forged by the government among several generations. In essence, the working generation agrees to finance the benefits of the generation in retirement, in exchange for a promise: that the same kinds of benefits will be available to them when they retire.

For this reason, public confidence plays a critical role in maintaining the vigor of social insurance programs like HI and OASDI. If the men and women of the working generation start to lose faith in the ability of the government to keep its promises, they won't willingly participate in the programs by paying the FICA taxes required to provide benefits to current retirees. In particular, public confidence in social insurance programs is bound to erode if the working generation senses that the government is promising more than it will actually be able to deliver when today's workers are ready to retire. (Interestingly, in passing the Medicare Catastrophic Coverage Act of 1988, Congress evidenced its awareness of the intergenerational inequities in the HI program by requiring that the costs of the new catastrophic benefits be financed completely by current beneficiaries. Thus, the catastrophic legislation involves no additional intergenerational shifts.)

Hospital Insurance Trust Fund

To bolster public confidence in the HI program when it was first created, and to ensure its ongoing financial integrity, the federal government set up a dedicated trust fund for the HI program when it was first put in place in 1965. This fund is similar to the trust funds created when the Social Security cash benefits programs were established.

The FICA taxes paid by employers and employees, in addition to the self-employed, are deposited in the trust fund. The FICA tax rate for HI has drifted upward over the years, but the tax rate is now scheduled (by law) to remain at 1.45% for employers and

Guy King is chief actuary, and Solomon Mussey is director, Office of Medicare Cost Estimates, Health Care Financing Administration, Baltimore, Maryland.

1.45% for employees, for a combined employer-employee tax rate of 2.9%. Benefits and administrative expenses are paid out of the trust fund, and any revenues not needed immediately are invested in government securities to earn interest.

Each year, a board of trustees (composed of the Secretary of the Treasury, Secretary of Labor, Secretary of Health and Human Services, and two public trustees) reports to Congress on the projected financial status of the program. Like so many other government and private health and retirement programs, the HI program draws upon the skills of an actuary (in this instance, the chief actuary of the Health Care Financing Administration—HCFA—which is responsible for administration of Medicare) to make the requisite projections.

Each report of the board of trustees has, since the mid-1970s, projected that the HI Trust Fund would be depleted within a very few years. More specifically, the report, released in April 1988, projected that the cupboard will be bare by 2005. Since this date is relatively close at hand, Congress and the public have tended to focus on the year of the trust fund's depletion as the principal indicator of the program's financial health.

In actuality, the trust fund's imminent depletion is only a symptom of a far more serious malady in the HI program: It reveals that the federal government is paying significantly higher benefits to the current generation of retirees than it can promise to future generations when they retire. In other words, the federal government is now paying HI benefits at an artificially high level, a level that it cannot hope to sustain over the long run.

If this inequitable situation is allowed to persist, public support for the HI program will be justifiably undermined, and public resistance to participating in the program will inevitably intensify.

Actuarial Balance

When an actuary asserts that the HI program is not in "actuarial balance," he means that the program's projected income is substantially less than the projected outlays for the period consid-

ered in the projection. The actuaries of HCFA make 75-year projections of the income and outlays of the program. At first blush, this may seem like a needlessly lengthy projection. But in fact, this is the minimum duration necessary to determine whether the future income of the program will be sufficient to pay for the benefits of most of the workers who are paying FICA tax contributions into the program today.

There are two big reasons why the growth in future income of the HI program is inadequate to cover the growth in future outlays:

- the inflation rate in payments made by the program to hospitals and other health care providers is greater than the inflation rate in wages and salaries of the workers who pay the FICA taxes that support the program;
- during the early years of the next century, the number of people receiving benefits from the program will be growing far more rapidly than the number paying into the program—primarily because of the post-World War II baby boom, and the subsequent drop in the birth rate.

As a consequence, by the middle of the twenty-first century, there will be only two workers to pay for the benefits of each retired person; today, there are four people to shoulder the cost of each retiree's benefits.

To forestall the total depletion of the HI Trust Fund, some fundamental changes will have to be made to the HI program. In this regard, a crucial question arises: Will these changes affect the different generations of beneficiaries equitably?

The various possible options for dealing with the financial problems of the HI program will doubtless have major ramifications for the issue of generational equity. To illustrate the proportions of this impact, we need a method for measuring the equity relationship among the different generations of HI beneficiaries.

Since HI benefits become available to the elderly at age 65, we can compare, for individuals retiring in various years, the value of the HI portion of their FICA tax contributions, accumulated with interest, to the value at age 65 of all their future benefits—

Table 1

Ratio of Benefits to Contributions

Proposed Change in Financing	Person Retiring in:		
	1988	2010	2030
1. Do nothing until trust fund is depleted, then reduce benefits to levels that can be supported by current HI taxes.	3.20	1.52 (.48)	1.18 (.37)
2. Reduce benefits immediately to a level that would place HI program in actuarial balance.	2.12	1.48 (.70)	1.50 (.71)
3. Reduce benefits immediately to a level that would place HI program in actuarial balance, then index tax rates.	2.12	1.78 (.84)	1.90 (.90)
4. Do nothing until trust fund is depleted, then increase HI taxes to pay benefits.	3.78	2.52 (.67)	2.02 (.53)
5. Increase HI taxes immediately to a level that would place HI program in actuarial balance.	3.78	1.99 (.53)	1.59 (.42)
6. No changes (hypothetical).	3.78	2.69 (.71)	2.73 (.72)

NOTE: Figures in parentheses represent ratio to the corresponding figure for 1988.

The Analysis Behind the Story

The relative extent of generational equity resulting from various policy options was assessed by comparing the rate of "return on contributions" for the several generations affected by the policy. In order to do this, three cohorts were compared, consisting of individuals retiring in 1988, 2010, and 2030. For each cohort, the rate of return on contributions is equal to the present value of future benefits, discounted for interest and mortality, divided by the accumulated value of their tax contributions. Let's look at each element in this computation in a bit more detail. The present value of future HI benefits is derived separately for males and females. We begin by calculating the average cost of providing benefits for an individual in every year from age 65 to 115. The average cost for the HI benefits in each year is based on the alternative II-b assumptions employed in the 1988 *Annual Report of the Board of Trustees of the Federal Hospital Insurance Trust Fund*. These assumptions reflect not only the average of annual changes in price and utilization, but also (considered separately, for each sex), utilization changes that occur as the beneficiary grows older.

The cost in each year is multiplied by a survival factor, which is the probability of surviving to each year in the future based on actuarial life tables for each cohort. These life tables were developed by the Office of the Actuary in the Social Security Administration. After it has been multiplied by the survival factor in each year, the cost is discounted to the year each cohort turned 65 (1988, 2010, 2030, respectively). The valuation interest rate varies in the decade 1988 to 1998, but after that reaches its ultimate rate of 6.125%. These interest rates are also based on the alternative II-b assumptions in the Trustees' Report. The discounted values are then summed for all years, for each cohort. This sum is the present value of future HI benefits for each cohort.

The present value of future benefits for a cohort needs to be compared to the accumulated value of contributions over a beneficiary's working career to get the rate of return on contributions. The accumulated value of contributions is derived by first considering what an individual earned in each year of his or her working career. It was assumed that each individual worked from age 20 to 65 (forty-five years of contributions into the HI fund). Since the HI program has only been in effect since 1966, the cohort retiring in 1988 did not have the opportunity to contribute to the HI program for their entire working

career. However, it would be more meaningful to compare generations on an equivalent basis. Therefore, we modeled contributions for the cohort retiring in 1988 as if the HI program had been in existence since 1943, the first year they would have paid payroll taxes.

The amount of contributions an individual makes in any year depends on the tax rate for that year, and the annual earnings the individual has in each year. The HI tax rates are set in the law for each year. For pre-1966 years, we assumed the tax rate would have been the same as the rate in 1966. The maximum amount of earnings subject to the HI tax is either set in the law or determined by a formula that is specified in the law. However, since most individuals earn less than the maximum amount subject to the HI tax, we developed three earnings scenarios corresponding to low, average, and maximum earnings (this last scenario would pertain to those who had earnings of at least the maximum amount subject to the HI tax).

The annual contribution by a worker is determined to be the annual earnings subject to the HI tax, times the HI tax for the given year. For purposes of determining the accumulated contributions, the annual tax contribution by a worker is assumed to earn interest at the rate, for June of the given year, for securities issued for the Federal Hospital Insurance Trust Fund. The June rate is compounded semiannually until the following June, when it is assumed to roll over into securities issued with the rate for that year. Each year's contribution is accumulated with interest in this manner up to July 1 of the year of retirement for each cohort (1988, 2010, 2030). These yearly contribution amounts, accumulated with interest, are then summed to derive the total accumulated tax contribution for the cohort.

The rate of return on contributions is now calculated by taking the present value of future benefits for each cohort, divided by the accumulated contributions for that cohort. If this ratio were equal to 2.0, for example, it would mean that a beneficiary would expect to receive twice the amount of benefits as the contributions with interest paid in over the course of his working career.

Table 1 displays these ratios for the three cohorts assuming different scenarios. □

discounted for both interest and mortality. (For purposes of measuring generational equity, we will ignore the benefits available to disabled beneficiaries under age 65; payments to disabled individuals account for only about 10% of the cost of the HI program.) The ratios of benefits to accumulated tax contributions that are computed can be considered as rates of "return on contributions," because they compare the value of the benefits that individuals will receive from the HI program to the amount of money they would have accumulated at age 65 if they had put an amount equivalent to their HI taxes into a savings account to accumulate with interest.

For the average person retiring in 1988, the "return on contributions" is \$3.78. This means that the average person retiring in 1988 at age 65 will receive \$3.78 in HI benefits during the remainder of his life (when interest and mortality are taken into account) for every dollar he accumulated in the HI program during his working life. This calculation, though, is purely hypothetical, because it ignores the fact that the HI trust fund will be

depleted in 2005 (before every individual retiring at age 65 in 1988 will have died) and assumes that the benefits projected can be provided without regard for the adequacy of the financing.

Under this hypothetical scenario, the average person who retires in 2010 will have a return on contributions of \$2.69. For the average person who retires twenty years later, in 2030, the return will have altered only slightly, to \$2.73.

Even under this hypothetical scenario, in which benefits aren't limited by inadequate financing, those who retire in later years get a lower return on contributions than someone who retires in 1988. When the average person retires in 2010, she receives only 71% of the return of a similarly average individual who retires in 1988 (for 2030, the figure is 72%).

Coping with Trust Fund Depletion

In general terms, there are only two options for dealing with financial insolvency in the HI program: (1) raise taxes, or (2) reduce benefits (although some combination of the two is of

course possible as well). But the effect on generational equity can be significant, depending on whether action is taken early, or delayed until the depletion of the fund is imminent. Table 1 shows the return on contributions for people who retire in 1988, 2010, and 2030, assuming that the HI program is placed in actuarial balance under various combinations of the two policy options (raising taxes or reducing benefits), and according to whether action is taken immediately or at the last possible moment.

In addition, the possible outcome of the hypothetical situation in which no changes are made is displayed (option 6), as is the consequence of a policy decision that would combine a reduction of benefits and taxes (option 3). The figures in parentheses under the columns for persons retiring in 2010 and 2030 represent the ratio of "return on contributions" to the return on contributions (under the same policy option) for a person retiring in 1988.

Those options that result in ratios closest to 1 indicate the greatest degree of generational equity, since a ratio of 1 means that the return on contributions is the same for an individual who retires in 2010 and 2030 as it is for our hypothetical average person who leaves the work force in 1988.

Table 1 shows that option 3 comes closer than any other to achieving true generational equity in the HI program. Under this proposal, the HI benefit will first be reduced to a level such that income and outgo for the HI program are equalized during the 75-year projection period, so that the program comes into actuarial balance. If this were the only measure adopted, however, a sizable trust fund balance would develop during the early years of the 75-year projection period.

Then, as the baby boomers began to retire, the trust fund balances would begin to dwindle; the trust fund would be depleted by the end of the 75-year projection period. The first step in option 3 is, therefore, exactly the same as option 2. The second step in option 3, though, entails adjustments in the tax rates during the early years of the projection period—to prevent the accumulation of a massive balance in the HI Trust Fund—followed by a period, in the later years, of upward adjustments in the later years, to cover the increasing costs of the then-retiring baby boom generation.

These adjustments to the tax rates are what make the results from option 3 a better approximation of generational equity than option 2. Absent such adjustments, the baby boomers would be paying higher taxes, not just to cover the benefits of earlier generations, but also to build a substantial fund that would, in part, finance their own benefits as well.

Picking a Policy Option

The data in the table permit some more general conclusions, too. First, it is obvious that the average person who retires in 1988 will secure a better return on contributions than someone who retires in 2010 or 2030, under any of the policy options considered here, even those that result in an immediate—and substantial—reduction in HI benefits.

Second, the cause of generational equity is best promoted by actions that are taken sooner rather than later: the two policy alternatives most conducive to fairness among generations (options 2 and 3) both depend upon the swiftness of corrective action.

Third, if action *can* be taken quickly, reducing benefits is a better promoter of generational equity than increasing tax rates. On the other hand, if action must be delayed until some later date, raising taxes is the best choice for promoting fair play between parents and children. □

One of the cornerstones of a strong social insurance program is a perception that the program is fair--that it doesn't, for example, merely shift wealth from one generation to another. In this context, one measure of generational equity is the ratio at age 65 of the present value of average benefits to the accumulated average contributions. This ratio answers the question, "How much will a person get out of the system compared to what he or she put into the system?"

For the Hospital Insurance (HI) program, this ratio is 3.95 for the average person retiring at age 65 in 1990. In other words, the average person retiring at age 65 in 1990 will get \$3.95 in benefits for every dollar he/she contributed. However, this ratio is only 3.21 for someone retiring in 2010, indicating a substantial inequity developing in the HI system.

The impact of various policy options on this measure of generational equity has been examined by comparing these ratios for persons retiring at age 65 in 1990, 2010, and 2030 under various policy scenarios. Policy option #5 produces the greatest generational equity, and, generally speaking, policy options involving increasing taxes produce the least generational equity.

Ratio of Benefits to Contributions

Person Retiring In:

<u>Proposed Change in Financing</u>	<u>1990</u>	<u>2010</u>	<u>2030</u>
1. Do nothing until trust fund is depleted, then increase HI taxes to pay benefits.	3.95	2.92 (.74)	2.07 (.52)
Do nothing until trust fund is depleted, then reduce benefits to levels that can be supported by current HI tax rates.	2.95	1.46 (.49)	1.11 (.38)
3. Reduce benefits immediately to a level that will place HI program in actuarial balance.	1.89	1.51 (.80)	1.50 (.79)
4. Increase HI taxes immediately to a level that will place HI program in actuarial balance.	3.95	2.18 (.55)	1.63 (.41)
5. Reduce benefits immediately to a level that will place HI program in actuarial balance, then index tax rates.	1.89	1.84 (.97)	1.88 (.99)
6. No changes (hypothetical)	3.95	3.21 (.81)	3.20 (.81)

NOTE: Figures in parenthesis represent ratio to the corresponding figure for 1990.

Health Care Financing Administration
Office of the Actuary
Office of Medicare Cost Estimates
July 12, 1990

APPENDIX H

Estimated Cost of Optional Medicare Coverage At Ages 62-66

**Office of the Actuary
Health Care Financing Administration
November 1990**



DEPARTMENT OF HEALTH & HUMAN SERVICES

Health Care
Financing Administration

Memorandum

Date November 30, 1990

From Sol Mussey
Office of the Actuary

Subject Optional Coverage of Medicare for Ages 62 to 66

To Health Technical Panel

In connection with an option to delay the age of eligibility to age 67, the Health Technical Panel asked us to cost out an option of providing voluntary coverage of Medicare for those eligible from age 62 to age 66. Listed in the table on the next page is the level premium amount for each age in 1991. The level premium is the rate a Medicare eligible would pay each month until he or she reached age 67. At that time the eligible person would obtain HI free and would be entitled to SMI by paying the usual SMI premium. As a contrast, we also show the increasing premium, if the premium was allowed to be determined on a yearly basis. In both cases, the premiums shown are the full cost of providing the same Medicare coverage currently provided to all aged beneficiaries.

In developing the premiums for this option, many factors were considered. First of all, this age group is younger than the average aged Medicare beneficiary. Therefore, one might expect that their average utilization is lower than for the average aged Medicare beneficiary. Current program statistics show that per capita reimbursement for the age 65 to 69 age group is about 20 to 25 percent lower than for the average aged beneficiary. However, since this option will be voluntary and paid for by the enrollee, there will be selection against the Medicare program. Another reason for selection by the enrollees is that many of them will have employer group coverage as a worker, spouse of a worker, or as a retiree and will not opt for Medicare until age 67. Also, with continuous open enrollment and no pre-existing condition exclusion or exclusion period, it is likely only sicker than average people would be willing to pay the high premiums. Based on some information we received from Blue Cross/ Blue Shield of Maryland, we estimated that the premium for this group should be approximately 30 to 40 percent higher than the full cost for an average aged beneficiary.

The level premiums in the table are higher for the younger ages. This reflects the fact that the level premium guarantees coverage for a longer period the earlier a person chooses to enroll. If premiums were allowed to increase each year there would be little age variation. Hence, we chose to show a single rate for the entire 5 year age group for 1991. This single rate should grow with program costs in later years. Also, the level premiums would increase with program growth in later years for new groups of enrollees.

The premiums in the table reflect the full amount paid by the enrollee. If the premiums were federally subsidized, a larger and healthier group would enroll, thereby spreading the risk. The premiums would be significantly lower depending on the degree of subsidy.

The analysis done here was extremely rough to approximate a premium for this group of enrollees. Conditions could exist to create a need for higher premiums. One drawback of the level premium approach is that the premium is fixed for up to 5 years. If initially the premium is too low, you are compounding the problem by not being allowed to change the premium for 5 years. On the other hand, in the current environment of budget cutting, the level premium has a built in margin since it does not anticipate budget cuts in the next 5 years.

Monthly Premiums for Voluntary Buyin Option for Ages 62 to 66
(1991)

<u>Age</u>	<u>Level Premium</u>	<u>Increasing Premium</u>
62	\$470	\$390
63	450	390
64	430	390
65	410	390
66	390	390


Sol Mussey
Director, OMMCE, OAct

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